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ANNUAL REPORT  
OF THE  
CANAL COMMISSIONERS  
OF THE  
STATE OF NEW YORK.  
Made January 8, 1863.

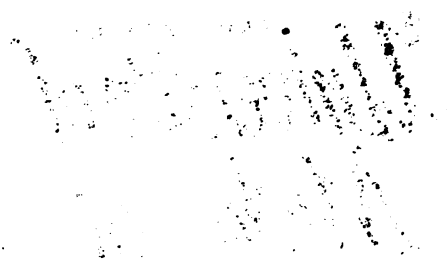
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ANNUAL REPORT  
OF THE  
CANAL COMMISSIONERS  
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TRANSMITTED TO THE LEGISLATURE JANUARY 8, 1863.

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# State of New York.

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No. 6.

## IN ASSEMBLY,

January 8, 1863.

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### ANNUAL REPORT OF THE CANAL COMMISSIONERS.

STATE OF NEW YORK:

CANAL COMMISSIONERS' OFFICE,  
ALBANY, December 31st, 1862. }

*To the Honorable the Legislature of the State of New York:*

The undersigned herewith transmit their respective reports, as Canal Commissioners, for the year 1862.

Very respectfully,

W. I. SKINNER,  
W. W. WRIGHT,  
F. A. ALBERGER,  
*Canal Commissioners.*



# REPORT.

STATE OF NEW YORK:

CANAL COMMISSIONERS' OFFICE,  
ALBANY, November 1, 1862. }

*To the Honorable the Legislature of the State of New York:*

Pursuant to the provisions contained in the Revised Statutes,  
the Canal Commissioners submit their

## ANNUAL REPORT:

The Board of Canal Commissioners, on the first day of January, 1862, consisted of William I. Skinner, whose term of office expires December 31, 1862; William W. Wright, whose term of office expires December 31, 1863; and Franklin A. Alberger, whose term expires December 31, 1864.

The Board was organized at their office on the fifteenth day of January, by the election of William I. Skinner as President, and William W. Wright as Secretary.

To William I. Skinner was assigned, in special charge, the Eastern division of the canals, which is made up as follows:

	Miles.
Erie canal, from Albany to the east bank of the Oneida Lake	
canal.....	136
Champlain canal.....	66
Glens Falls feeder.....	12
Pond above Troy dam.....	3
Black River canal, and Black River improvement.....	98
	<hr/>
	315
	<hr/>

To William W. Wright was assigned, in special charge, the Middle division of the canals, which embraces the following:

	Miles.
Erie canal, from the east bank of the Oneida Lake canal to the county line between Seneca and Wayne counties, including the several feeders and reservoirs.....	76
Chenango canal, feeders and reservoirs.....	97
Oswego canal.....	38
Oneida Lake canal.....	7
Oneida River improvement.....	20
Seneca River towing-path.....	5 $\frac{1}{4}$
Cayuga and Seneca canal.....	23
Cayuga inlet.....	2
Crooked Lake canal.....	8
Chemung canal.....	23
Chemung canal feeder.....	16
Seneca River improvement.....	12 $\frac{1}{4}$
	<hr/>
	329
	<hr/>

To Franklin A. Alberger was assigned, in special charge, the Western division of the canals, which embraces the following:

	Miles.
Erie canal, from the county line between Seneca and Wayne counties, to Buffalo, including the Main and Hamburg street canal, slips, and basins at the latter place.....	155
Genesee Valley canal.....	118
Extension of Genesee Valley canal.....	7
	<hr/>
	280
	<hr/>
Total authorized canals.....	924

## EASTERN DIVISION.

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### CANAL REPAIRS.

#### ERIE CANAL.

The Eastern division of the Erie canal, commencing with the south end of the Albany basin, extending to the east bank of the Oneida Lake canal at Higginsville, including that part of the Champlain canal beginning at its junction with the Erie canal at the foot of the guard lock at Mohawk river; also, including all feeders, dams, side-cuts and structures connected therewith, is divided into five superintendent or repair sections: The first three of which, eighty-eight miles in length, have been under the supervision of Robert C. Dorn, as superintendent of canal repairs, and the remaining sections, two in number, fifty-four miles in length, under the supervision of John Beardslee, as superintendent of canal repairs.

#### SECTION No. 1—*Robert C. Dorn, Superintendent.*

This section extends from the south end of the Albany basin, to the west end of the lower Mohawk aqueduct, and includes the Port Schuyler and West Troy side-cuts, the Champlain canal from the junction to the Mohawk river, the Troy dam, sloop lock, and the pond above, making a total length of nineteen miles.

The structures upon this section are:

- 46 locks, including two weigh locks,
- 182 lock gates,
- 20 culverts,
- 10 road bridges, (wood,)
- 11 do (iron,)
- 11 farm bridges, (wood,)
- 2 towing path bridges, (wood,)
- 1 aqueduct,
- 6 waste weirs,
- 1 work shop, and two timber sheds.

## EASTERN DIVISION.

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### CANAL REPAIRS.

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- 20 culverts,
- 10 road bridges, (wood,)
- 11 do (iron,)
- 11 farm bridges, (wood,)
- 2 towing path bridges, (wood,)
- 1 aqueduct,
- 6 waste weirs,
- 1 work shop, and two timber sheds.

The repairs of this section are contracted to Charles T. Baldwin for the term of three years, from March 4, 1860, at the sum of \$28,440 per annum. His contract expires March 4th next.

*New Structures.*—In pursuance of chapter 119, Laws of 1860, a bridge of iron superstructure has been built over the canal at Van Vliet street, in the village of Cohoes, at an expense to the State of \$3,000. A new wooden bridge was built at Fonda's farm crossing, and a foot bridge which had been used temporarily to supply the place of a fallen bridge on Ferry street, West Troy, was moved to Utica street, where it still remains.

Under a resolution of the Canal Board, snubbing posts have been set about eight hundred feet distant from each other the entire length of the section; they cost \$327.37.

*Repairs to structures.*—The piers of the lower Mohawk aqueduct have been extensively repaired. They were retimbered and planked anew. The repairs to the locks have been considerable. Nine new lock gates, several mitre sills, and quite a number of new paddles, heel and toe posts and balance beams have been put in, and other structures have received the needed repair.

The change bridge at the lower Mohawk aqueduct, for purposes of convenience, was moved, in pursuance of a resolution of the Canal Board; it cost \$1,206.

*Structures requiring repairs.*—The lock gates upon this section of the canal require considerable repair, and many of them should be replaced. Many of the mitre sills must be renewed, and the valves in nearly all the locks should be new next spring.

The Troy dam is considerably out of repair, and to insure sufficient depth of water the whole season, should be raised in some places at least fifteen inches, and be extensively repaired.

These, with the necessary repairs to the docking, slope wall and bridges, will put this section in good working order.

During the season of navigation, a number of men have been employed at Albany, West Troy, and at the Sixteen Locks, to assist boats navigating the canal. These forces and the night patrol or police have been maintained at an expense of \$4,600.

Amount expended by superintendent of repairs	\$11,639 98
do paid repair contractor.....	29,240 00

Total for the year.....	<u>\$40,879 98</u>
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*Detailed Statement of Expenditures by the Superintendent of Repairs, Section No. 1.*

Structures or Works.	Whole number	Cost of new structures.	Cost of repairs old structures.	Total.
Locks .....	44	-----	\$53 91	\$53 91
Weigh locks .....	2	-----	24 08	24 08
Lock gates .....	182	-----	-----	-----
Aqueducts .....	1	-----	2,900 00	2,900 00
Waste weirs .....	6	-----	-----	-----
Culverts .....	20	-----	-----	-----
Farm bridges .....	11	\$520 68	185 00	705 68
Road " (wood) .....	10	303 13	-----	303 13
" " (iron) .....	11	-----	-----	-----
Towpath bridges .....	2	-----	100 00	100 00
Breaking ice and assisting boats in the ice. ....	-----	-----	791 00	791 00
Assisting navigation at Albany, West Troy and Sixteen Locks. ....	-----	-----	4,600 00	4,600 00
Miscellaneous expenditures .....	-----	-----	1,650 48	1,650 48
Add $\frac{1}{2}$ Supt. salary .....	-----	-----	-----	333 33
Add $\frac{1}{2}$ Clerk hire .....	-----	-----	-----	180 00
Total .....	-----	-----	-----	\$11,639 98

The business of the city of Albany upon the canals has increased to such an extent as to demand greater conveniences on the level between locks 1 and 2. The canal at this point was enlarged prior to 1842, upon the then approved plan of a slope wall resting upon a bench of earth. The bench and slope wall extend so far into the canal that a loaded boat cannot approach nearer than about eighteen feet of the top line of the bank, and where a boat is unloading upon each side it is almost impossible for another to pass. An abundance of room might be made by taking out both slope wall and bench, and building either a slope or vertical wall to canal bottom. The distance between the two locks is about seventy-two chains. I would recommend the removal of the bench and slope wall, and the construction of a vertical wall from lock No. 1, thirty-six chains west, one-half of the distance, and of a slope wall to bottom for the remaining distance. The cost of such a work would be about \$30,000.

I would also recommend the construction of a new lock in place

of the old and abandoned lock at lock No. 2. There has been but one lock in use here for a number of years, and that is a large and improved lock. The rebuilding of the lock would give the same capacity to the canal from Albany to Troy as the canal has at other points. A lock constructed on the present enlarged plan would cost about twenty-five thousand dollars.

The construction of a second lock at this point, a short distance above the extensive lumber yards near Albany, was adopted as a part of the plan of the enlargement under the amended 3d section of the 7th article of the Constitution, and considerable progress was made by the contractor in preparing the stone and materials for the lock. The work was not urged forward owing to the want of funds, and the necessary use of the limited means at other and more pressing points. The work was finally abandoned, and the materials were used in constructing an enlarged lock on the Champlain canal. The increased business of the canals since 1859, and especially the transportation of lumber to the yards below, seems to render the construction of the second lock extremely needful to accommodate this large and increasing transportation.

Frequent delays in navigation arise from the grounding of loaded boats upon the slope wall and bench of the canal through the village of West Troy, and the consequent wedges and jams occasioned by it. This section of the canal was completed on the old plan of a slope wall resting on a bench of earth, which together project into the canal some ten or twelve feet. More boats pass over this portion of the canal than over any other. The Champlain and Erie boats both pass over it. If the slope wall and bench were removed, and a vertical wall put in, four boats (instead of three as now) might pass abreast, and the almost constant crowding and wedging at that place be avoided.

An estimate has been made of the cost of such an improvement for the required distance, 154 chains; it would cost nearly \$50,000. It is a work which is warranted by and necessary to the present business of the canals, and I would earnestly recommend an appropriation therefor.

The increased business upon the canals also demands that the single locks at the West Troy side-cut should be doubled, so boats may be locked into the river as fast as they are locked upon the levels from the double locks above.

The bridge superstructure on Broad street, West Troy, leading

over the upper side-cut, is built one-half of iron and one-half of wood. The wooden part is much out of repair, is unsafe, and should be rebuilt, so as to correspond with the other part. The estimated cost of such an improvement is \$3,205.68, and as it is not included in the repair contract, provision must be made in some other way for it. It should be finished before navigation in the spring.

SECTION No. 2—*Robert C. Dorn, Superintendent.*

This section extends from the west end of the lower Mohawk aqueduct to the head of lock No. 27, and is thirty-two miles in length.

The structures on this section are :

- 18 locks—1 guard lock,
- 1 work shop and timber shed,
- 1 dam,
- 19 culverts,
- 6 lock houses,
- 20 road bridges, (wood,)
- 3 road bridges, (iron,)
- 3 aqueducts,
- 2 waste weirs,
- 16 farm bridges,
- 1 towing-path bridge.

The contract for the repairs of this section was let, March 4th, 1860, to William McClary, for the sum of \$9,700 per annum, for the term of three years. It expires March 4th, 1863.

*New structures.*—Two bridges, one near Philip's lock, and one near Vedder's, have been built by the repair contractor. A slope wall with cement filling has been constructed at the breach of 1859, on the berm and tow-path sides of the four mile level, at an expense of \$2,003.89. The embankment was considered dangerous on account of its height and proximity to the river.

Agreeable to a resolution of the Canal Board, snubbing posts have been set along the entire section, at a cost of \$526.50. Several lock gates have been built to be used as needed—they cost \$839.79.

*Repairs to old structures.*—In the fall of 1859, the arch culvert on section No. 30, was torn out by a breach in the canal. It has been rebuilt during the past season, is a work very much needed, and cost \$3,179.10.

The contract for the removal of the big bevels on this section,

was this year completed. Their removal increases the capacity of the locks considerably. The work cost \$1,787.50.

The timber sheds at Rexford Flats, has been repaired at a cost of \$213.24.

It was feared that the bottom of lock No. 20 would fail; an additional course of planking was therefore put down, and the lock made safe. It cost \$256.88.

The benches near the breach on the four mile level were taken out, and the bottom of the canal was concreted; this cost \$1,105.02. The bank of the canal, near Flint hill, has from time to time been sliding, and was considered dangerous; it has been protected by piles, at an expense of \$454.06.

*Structures requiring repairs.*—The lock gates, valves and other fixtures upon this section, must in many instances be renewed, and the wooden structures at nearly every lock need general repairs. The bridges at Fonda's aqueduct, Marcellus' and John Kline's, should be rebuilt, and those at Crescent, and at the ferry near Schenectady repaired, and the towing path bridge at Rexford's Flats, near the feeder, should be raised and repaired.

About five hundred feet of docking is needed on the short level at Rexford's Flats, and the plank and docking through Schenectady, for about two miles, should be relaid.

The towing path on the short level, and on the feeder, ought to be raised.

The main dam at the upper Mohawk aqueduct, running obliquely across the river, and being built of loose stone, affords but an imperfect resistance to the current, and is consequently damaged by every considerable rise in the river, and is at all times liable to get out of repair, very leaky and expensive in its maintenance. In the dry parts of the year it often fails to furnish sufficient water for the purposes of navigation, though there is more than sufficient running through it.

A permanent stone dam should be built at right angles with the river, which is here about seven hundred feet wide, with a rock bottom. It would save the State the annual cost of repairs, and at all times furnish enough water for canal purposes. It would cost about \$20,000, and I would recommend the appropriation of such a sum for that purpose.

The present change bridge at the foot of lock No. 22 is badly located for the convenient use of that lock. A new one ought to be built at the head of lock No. 21, with a towing path on the

berm side between the locks; it would increase the capacity for lockages about one-third, and would cost about \$10,000. It should be done before the opening of navigation.

These, together with a few repairs to the wall on the short level, and some few to the aqueduct at Van Slyke's, and, if possible, the removal of the benches which may remain, will place this section in fine working order.

Amount expended by superintendent of repairs.....	\$10,994 59
Amount paid repair contractor .....	9,370 78
Total for the year.....	<u>\$20,365 37</u>

*Detailed Abstract of Expenditures by the Superintendent, for fiscal year, on Section No. 2.*

Structures or Works.	No. on section.	Cost of new structures.	Cost of repairs of old.	Total.
Locks .....	18	-----	\$281 63	\$281 63
Guard lock .....	1	-----	-----	-----
Culverts .....	19	-----	-----	-----
Road bridges, (wood) .....	20	-----	-----	-----
"    "    (iron) .....	3	-----	-----	-----
Farm " .....	16	\$295 89	-----	295 89
Towpath " .....	1	-----	-----	-----
Aqueducts .....	3	-----	450 75	450 75
Waste weirs .....	2	-----	-----	-----
Feeder dam .....	1	-----	-----	-----
Timber shed and work shop .....	1	-----	213 24	213 24
Slope wall .....	-----	2,003 89	-----	2,003 89
Taking out benches and concreting .....	-----	-----	1,015 00	1,015 00
Lock gates .....	-----	838 79	-----	838 79
Miscellaneous .....	-----	-----	3,076 07	3,076 07
Breaking ice and assisting boats in ice .....	-----	-----	2,306 17	2,306 17
Add $\frac{1}{2}$ Supt. salary .....	-----	-----	-----	333 33
Add $\frac{1}{2}$ Clerks' hire .....	-----	-----	-----	180 00
Total.....	-----	-----	-----	<u>\$10,994 59</u>

SECTION No. 3.—*Robert C. Dorn, Superintendent.*

This section extends from the head of lock No. 27 to the foot of lock No. 34, and is thirty-seven miles in length. The structures embraced on this section are:

- 14 lift locks,
- 3 guard locks,
- 10 aqueducts,
- 29 culverts,
- 5 waste weirs,
- 31 farm bridges,
- 18 road bridges (wood),
- 6 road bridges (iron),
- 1 wire suspension foot bridge at Fort Plain,
- 2 dams,
- 2 workshops, and
- 3 lock houses.

The repairs on this section were, on 23d day of April, 1859, let to John McDonald, for \$7,440 per annum, for a term of three years from the 1st day of May, 1859. It expired May 1st, 1862, and was let for the term of four and two-third years, for the sum of \$10,900 per annum, to Jared P. Dodge, Jr.

*New Structures.*—New docking has been placed along the bank of the Aurie's creek, the channel cleaned, the apron taken up and relaid, and the rear of the docking filled in. The whole cost \$1,734.08.

The canal below Schoharie creek has, for a long time, suffered severely during the dry season for want of water. The dam was very poor, and was in constant want of repair. During the past year a dam of concreted stone masonry has been erected in its place, which will be permanent, and supply all the water necessary. The estimated cost, at contract prices, is \$22,000; the final account is not yet complete.

No repairs have been necessary to be made by the superintendent, except to keep in repair the old Schoharie dam, which was not included in the repair contract. The dam was built of brush and stone, which formed but a slight barrier to the sudden freshets the stream is subject to. The repairs of the dam cost \$4,617.88. The Schoharie creek aqueduct, over which the ice of last season was flooded, was repaired for \$107.96.

*Breaches.*—There have been two breaches upon this section the past year. The first occurred on the night of May first, at

Newkirk's dry dock, near the village of Port Jackson. The dock was built under a resolution of the Canal Board, and was repaired by the State at a cost of \$947.57. This break suspended navigation until the fourth of the month.

The second breach occurred on the eleventh day of June, and delayed navigation until the thirteenth. The break was in the berm bank of the canal on the fourteen mile level, near Printup's aqueduct. It was repaired by the repair contractor and cost \$542.19.

Pursuant to a resolution of the Canal Board, snubbing posts have been set along the section, about eight hundred feet distant from each other; they cost \$559.13.

*Structures requiring repairs.*—The head of the guard dock at Schoharie creek feeder should be raised about two feet. It has been necessitated by raising the water in the creek by the new dam. It is feared that the great rise of the water in the spring or at times of freshets will overflow the lock and enter the feeder and canal below, and wash out the banks, producing a breach. A new bulkhead should also be built, so as to allow the passage of sufficient water into the feeder in dry seasons. The whole would cost about \$2,000, and should be done immediately.

Several new lock-gates and valves will be required on this section, and some slighter and less important repairs.

Printup's, Lasher's, Yates', Spraker's, the Canajoharie, and the Fort Plain aqueducts will require extensive repairs before the opening of the canal.

Ender's bridge should be raised, and with one or two others be repaired.

Amount expended by the superintendent of repairs.. \$12,800 91

Amount paid repair contractor..... 7,871 27

Total for the year..... \$20,672 18

*Detailed Abstract of Expenditures by Superintendent of Repairs  
Section 3, for the fiscal year ending September 30, 1862.*

Structures or Works.	No. on section.	Cost of new structures.	Cost of repairs of old.	Total.
Locks .....	14	.....	.....	.....
Guard locks .....	3	.....	.....	.....
Aqueducts .....	10	.....	\$107 96	\$107 96
Waste weirs .....	5	.....	.....	.....
Culverts .....	29	.....	.....	.....
Farm bridges .....	31	.....	.....	.....
Road bridges, (wood) ..	8	.....	.....	.....
"    "    (iron) ..	6	.....	.....	.....
Wire suspension bridge	1	.....	.....	.....
Feeders .....	2	.....	4,617 88	4,617 88
Lock houses .....	3	.....	.....	.....
Work shops .....	2	.....	.....	.....
Docking .....		1,734 08	.....	1,734 08
Repairs of breaches ..		.....	1,489 76	1,489 76
Breaking ice and assist- ing boats in ice .....		.....	1,477 49	1,477 49
Miscellaneous expendi- tures .....		.....	2,860 40	2,860 40
Add $\frac{1}{2}$ of Supt. salary ..		.....	.....	333 34
Add $\frac{1}{2}$ of Clerk hire ..		.....	.....	180 00
Total .....		.....	.....	\$12,800 91

SECTION No. 4—*John Beardslee, Superintendent.*

This section extends from the foot of lock No. 34 to the head of lock No. 45, and is twenty-one miles in length. The following are the structures upon this section:

- 24 locks—1 guard lock,
- 192 lock gates,
- 4 aqueducts,
- 7 waste weirs,
- 10 culverts,
- 24 farm bridges, (wood,)
- 11 road bridges, (wood,)
- 2 road bridges, (iron,)
- 1 tow-path bridge, (wood,)
- 2 draw bridges, (wood,)
- 1 dam,
- 2 feeders with guard locks,



8 lock houses,  
2 work shops,  
12 watch houses.

The repairs upon this section were, on the 1st day of May, 1859, let to John F. Hosch, for the term of three years from that date, for the sum of \$8,849 per annum.

The contract expired May 1, 1862. The section was again let (the contract to take effect at the expiration of the last) to John F. Hosch and Liberty L. Lowell, for four and two-third years, at the rate of \$12,780 per annum.

*New structures.*—Twenty-two lock gates, three lock bridges, four farm bridges, and a bulkhead in the old feeder at Little Falls, have been constructed, and ten new valves have been put in old gates. Two lock gates, in place of the old gates of Seeley's patent, have been put in by the State; other structures have had all needful and necessary repairs.

Snubbing posts have been set along the whole length of the section, about three hundred and fifty feet distant from each other, pursuant to a resolution of the Canal Board.

*Structures requiring repairs.*—The towing path at the head of lock No. 34 should be straightened, and the docking should be repaired. A new pier is needed at the head of lock No. 35. Castle creek aqueduct must be pretty generally repaired.

At Schuyler's landing, on the berm side of the canal, piles should be driven for the protection of the bank and vertical wall, and at the foot of the towing path bank, to prevent its sliding into the river, and the towing path and vertical wall, for about a mile from the foot of lock No. 36, will have to be considerably repaired. A new bridge, in place of the swing bridge over the feeder on Mill street, Little Falls, should be built, the present bridge being very badly constructed. At the head of lock No. 40, a waste weir, in place of the old one which has gone out, should be built, and the towing path graveled between locks Nos. 40 and 41, nearly the whole distance.

Ten lock gates will have to be inserted the coming season, and a new pier is needed at the head of lock No. 41.

*Breaches.*—In the spring, before the diminution in the length of this section, a breach occurred at Castle creek. It was occasioned by the unusual flooding of the Mohawk river. The Rocky Rift feeder was breached in several places, and bridges, abut-

ments, and whatever opposed the flood, were swept away. The repairs were completed before the opening of navigation, and cost \$703.

The bottom of lock No. 35 burst out June 10th, 1862, and caused a detention of twenty-four hours.

Amount expended by superintendent of repairs. \$6,623 57

Amount paid repair contractors..... 9,562 44

Total for the year..... \$16,186 01

#### SECTION No. 5.—*John Beardslee, Superintendent.*

This section extends from the head of lock No. 45, to the east bank of the Oneida Lake canal, at Higginsville, and is thirty-four miles in length.

The structures upon this section are as follows :

2 locks,	8 lock gates,
1 weigh-lock,	4 aqueducts,
29 culverts,	4 waste-weirs.
23 farm bridges, (wood,)	
6 farm bridges, (iron,)	
18 road bridges, (wood,)	
18 road bridges, (iron,)	
1 towing-path bridge,	
2 foot bridges, (wood,)	
1 foot bridge, (iron,)	
2 lock houses,	2 work shops,
1 watch house,	5 store houses,
2 timber sheds,	2 dams,
1 collector's office, Utica.	

The contract for the repairs of this section was awarded to Eli T. Bangs, for the term of three years, commencing March 4, 1860, at \$5,890 per annum; it expires March 4, 1863.

*New structures.*—A dam on Wood creek, at Rome, has been built during the past season. The expenses were paid by the State, it not being included in the repair contract. It cost \$501.05.

Two bridges have been built, one at the starch factory at Utica, and the other at Darling's, between Rome and Oriskany, and the others have been thoroughly repaired during the summer.

*Structures to be repaired.*—Lock No. 46 needs four new gates

The towing path on the nine mile level will have to be raised and graveled. The culvert under the canal, on Broadway, Utica, will have to be rebuilt, or iron tubes be substituted for it. Iron tubes will have to be put into Whitle creek culvert. The canal should be bottomed out from Clay street, Utica, to the starch factory; it has never been taken out down to the original bottom line; and about one hundred rods between Oriskany and Hennesey's should also be bottomed out; and a railing should be put on both sides of the Oriskany bridge approaches; they are high and dangerous.

The amount expended by the superintendent.. \$4,738 00

The amount paid repair contractor..... 6,237 41

Total for the year..... \$10,975 41

*The following are the amounts expended on the Eastern Division of the Erie Canal, for a series of years past.*

YEAR.	Sec. 1.	Sec. 2.	Sec. 3.	Sec. 4.	Sec. 5.	Sec. 6.	Total.
1851.....	\$74,632 71	\$27,317 17	\$40,073 38	\$30,451 95	\$26,937 64	\$23,289 89	\$222,702 54
1852.....	136,016 49	47,858 59	51,651 16	35,904 45	33,288 04	24,171 07	328,889 80
1853.....	101,124 60	32,101 88	44,403 64	33,128 69	29,602 41	35,803 29	276,164 51
1854.....	75,298 10	42,256 86	61,674 97	46,187 95	29,099 71	44,120 44	282,642 82
1855.....	57,875 36	63,016 64	76,597 47	42,361 22	32,354 39	28,125 13	300,330 21
1856.....	42,954 22	27,181 56	49,232 00	44,436 55	40,147 81	24,489 52	228,441 66
1857.....	46,113 36	17,953 21	21,990 18	35,598 80	29,922 29	14,291 32	165,869 16
1858.....	46,630 34	28,398 85	25,876 28	35,831 81	27,260 04	.....	163,997 32
1859.....	102,000 64	26,166 15	37,766 71	26,969 66	22,842 36	.....	215,745 52
1860.....	41,054 96	25,551 84	13,641 45	10,679 26	19,417 25	.....	110,314 76
1861.....	41,797 56	20,261 52	14,598 23	13,444 52	10,177 80	.....	100,279 63
1862.....	40,879 98	20,365 37	20,672 18	16,187 01	10,975 99	.....	109,080 53

### CHAMPLAIN CANAL.

This canal commencing with the foot of the guard lock on the Mohawk river and extending to Whitehall, including the Glens Falls feeder, is divided into three superintendents' or repair sections. The whole length of the canal is about seventy-six miles. The first two sections of this canal were until the third day of February last in charge of Alexander Barclay, as superintendent of repairs, and the third section was in charge of Lyman Holbrook as superintendent, when Joseph McFarland was appointed superintendent in charge of the whole canal.

## SECTION No. 1.

This section extends from the south end of the guard lock at Cohoes, to the south end of the first lock north of Fort Miller bridge, and is twenty-eight miles in length.

The contract for the repairs of this section was let to Charles J. De Graw, for the term of five years, commencing August 1st, 1860, at the sum of \$8,659 per annum. It was abandoned June 1st, 1862, on account of the failure of the contractor to perform the contract. It was afterwards awarded to Archibald McArthur, for the term of four and one-fourth years, at the rate of \$13,848 per annum, to commence October 1st inst.

The structures upon the section are :

- 12 locks,
  - 1 weigh lock,
  - 1 aqueduct,
- 11 waste-weirs,
- 8 culverts,
- 2 work shops,
- 1 store house,
- 36 farm bridges,
- 28 road bridges,
- 7 towing-path bridges,
- 7 lock houses,
- 1 " " and collector's office,
- 1 watch house,
- 1 timber shed,
- 2 dams, (one across Hudson, and one across Mohawk river,)
- 1 watch house and collector's office,
- 5 foot bridges.

*New structures.*—Three road bridges, at Waterford, Mechanicsville, and Fitzgerald's; five farm bridges, one on the three mile and four on the sixteen mile level, and three stone bridge abutments have been built, at an aggregate cost of \$1,712.72.

Deming's new culvert at Rud's basin has been lengthened and the embankment on the berm side of the canal widened and strengthened. It cost \$164.05.

The Mohawk river dam has been raised, in accordance with a resolution of the Canal Board, about fifteen inches, and at an expense to the State of \$4,485.15.

The channel of the canal in Mills' swamp on the four mile level,

Waterford side-cut, and in the vicinity of Stillwater basin on the sixteen mile level, was thoroughly dredged out and made uniformly thirty-five feet wide at bottom. It cost \$1,136.25.

The ditches draining the water which leaks through the canal banks at Losee's and Holmes' farms were cleaned out at an expense of \$120.

The towing path on the sixteen, four, three, and two mile levels has been repaired and graveled in many places for \$508.65.

*Structures repaired.*—The aqueduct at Schuylerville, the waste weirs at Stillwater and Mechanicville, the towing path bridges at the Mohawk river, Fulton's, Waterford, and Saratoga, and many farm bridges were repaired, and cost \$640.77.

New docking was put in at the Hudson and Mohawk rivers, Waterford side-cut, and on the sixteen mile level, at a cost of \$586.50.

*Breaches.*—On the twenty-ninth of May last a large breach occurred at Coeville sand banks. Nine hundred feet of towing path, two hundred feet of embankment, and the bottom of the canal to the depth of twelve feet, for the distance of about eleven hundred feet, were swept out. The contractor refused to repair the breach, and his contract was therefore abandoned, and the repairs were made by the superintendent at an expense of \$9,201.05. Navigation was suspended for six days in consequence of the breach. Its cause is unknown.

The expenses of lock tending to the State during the time from the abandonment of the old contract to the beginning of the new were \$1,335.50.

Accounts which accrued under the former superintendents have been paid to the amount of \$95.25.

For breaking ice, assisting boats in consequence of ice, raising sunken boats, watching the banks of the canal, raising bridge approaches, repairs of the State scow, tools, superintendent's salary, clerk hire, office rent, and other miscellaneous expenses the sum of \$1,633.49 has been expended.

*Sunken boats.*—During the last year there have been five boats sunken upon this section. Two were sunken November 20th, 1861, on the four mile level, by running into each other; they were laden with lumber and wood. Another sunk December 1st, 1861, on the two mile level, having run upon a stone which had

been pulled from the bank into the channel. The fourth, an old boat overladen with grain, sank May 3d, 1862, at Mechanicville, and the fifth sank August 20th in the Mohawk river, the water being too low in the channel.

*Structures requiring repairs.*—The structures which require thorough and extensive repairs or reconstruction are as follows: Schuylerville aqueduct, the lock gates at locks Nos. 8 and 10 Hutchin's, Manche's, Chase's, and Marshall's farm bridges, Ensign's, Mechanicville, and Schuylerville road bridges, the bridge abutments at Manche's, Fitzgerald's, Van Wei's, Ensign's, Hutchin's and Handy's, and the vertical wall at the head of Flinn's lock.

The snubbing posts at nearly all the locks on this section should be reset.

The prism of the canal between Coeville and Bemis Heights should be widened and the towing path in several places raised and graveled.

The embankment through the Coeville sand banks in the vicinity of the breach is insecure, and should be supported by a slope wall. The bottom of the canal which was washed out at the time of the breach, should be filled up to the height of the bottom elsewhere.

The only delays in navigation have been occasioned by the breach and the bad condition of the dam, which is too low and badly out of repair.

Amount expended by the superintendent of repairs..	\$12,145 51
Amount paid repair contractor.....	4,606 96
Total for the year:.....	<u>\$16,752 47</u>

The weigh lock at Waterford was finished early this spring and has been in use nearly all the season. It has considerably relieved the West Troy level and weigh lock, and weigh lock at Albany, from the crowd of boats heretofore existing, and which this season must have been immense. It has weighed all the boats passing up and down the Champlain canal since it came into use, and it has saved a large amount in labor and tolls for the State. It is of simple construction, and is not liable to get out of order; the scale is accurate and meets the most sanguine expectations. Both lock and scale may truthfully be called a success.

The expenses of the construction of the weigh lock were charged to the repairs of the canal, and have necessarily increased the amount expended for repairs. The lock and scale cost \$22,115.70.

#### SECTION No. 2.

This section extends from the south end of the first lock north of Fort Miller bridge to Dunham's basin, and includes the Glens Falls feeder and pond above, making in all twenty-four miles in length.

The repairs of this section were let to Anson Bangs for the term of five years, commencing August 1st, 1860, for the sum of \$9,300 per annum.

Upon this section the structures are as follows :

- 19 locks,
- 7 waste weirs,
- 19 farm bridges,
- 3 towing path bridges,
- 1 work shop,
- 1 dam across the Hudson river, 900 feet long,
- 3 aqueducts,
- 9 culverts,
- 17 road bridges,
- 10 lock houses,
- 1 store house.

A large amount of docking has been constructed upon the five mile level during the past year. It cost \$531.40. The towing path on the five, three, one and two mile levels was repaired and graveled, for considerable distances, at a cost of \$489.87.

The berm bank over the culvert, at Blackhouse, on the five mile level was found to be insecure, and, under the direction of the division engineer, was strengthened and widened. It cost the State \$176.

The locks on the Glens Falls feeder have been, from time to time, graveled, at a total cost of \$80.64.

The embankment at Robinson's road bridge, on the five mile level, has been raised, which, together with some repairs done to the bridge, cost \$39.42. The slope wall on the one and three mile levels has been repaired in a few places.

During the season it became necessary to put a boat measurer and inspector at Fort Edward ; the boats so often drawing more

water than was legally allowed made frequent causes of complaint. He was paid \$140.

Old accounts, or those accruing under the former superintendent, were paid, to the amount of \$60.05. Extra lock tending paid by the State, and charged to the repair contractor upon this section, amounted to \$81.05.

The breaking of the ice, and the assistance rendered boats in the ice, in the fall of last year, with other miscellaneous expenditures, including the salary of the superintendent and clerk hire, amounted, in the aggregate, to \$1,013.60.

A large portion of the expenditures above named were charged to, and paid by, the repair contractor.

The following structures will require rebuilding, or very thorough repairs, the coming season :

The locks at Fort Edward, Moses kill and Fort Miller should be rebuilt, the flooring in the Glens Falls feeder locks repaired, and six new gates put in, a new road bridge at Stanton's, new farm bridges at Haverland's and Geer's on the Glens Falls feeder, the abutments to the covered road bridge at Fort Edward, Haverland's, Geer's and Galucia's bridges taken up and relaid.

A large amount of docking on the five mile level should be relaid before navigation in the spring.

*Breaches.*—A small breach on the Glens Falls feeder occurred September 9th. It was repaired by the contractor. Navigation was interrupted about 36 hours.

During the past year an old boat was abandoned by the owner and sank upon the five mile level. It caused no delay in navigation.

The improvement of the Glens Falls feeder, by stopping the leaks so long complained of, which was commenced late last year, in pursuance of chapter 213 of the Laws of 1860, has, to a considerable extent, been accomplished. The part still remaining unfinished will be completed before the spring navigation. This feeder feeds the Champlain canal for a distance of nearly 33 miles, and passes over, in its course to the canal, several broken limestone ledges. It lost, in its passage through these rock cuts, so much of its water, through the seams and crevices that, at the lower end, there was, except at unusually high water, insufficient for the purposes of navigation.

It now affords sufficient water both for navigation upon it and upon the main canal.



Amount expended by the sup't of repairs....	\$2,160 22
do paid by repair contractor.....	8,506 63
Total for the year.....	<u>\$10,666 85</u>

## SECTION No. 3.

This section extends from Dunham's basin to Whitehall, a distance of twenty-two miles. The repairs of this section were, July 17, 1860, let by contract to Solon Vandenburg for the term of five years, commencing August 1, 1860, for \$4,300 per annum.

The following are the structures upon it:

8 locks,	20 farm bridges,
3 culverts,	4 towing-path bridges,
5 waste-weirs,	5 small dams on Wood creek,
7 road bridges,	4 lock houses.

During the past year a large quantity of new docking has been put in on the five mile level, and the towing-path has been raised, graded, and widened. The docking cost \$461.96, and the repairs to the towing-path \$656.75.

The prism of the canal on the five and twelve mile levels, which had been filled up with material from the banks and from the washing of streams, was cleared out at a cost of \$531.17.

Snubbing posts have been set at Whitehall, at an expense to the state of \$35. An old sunken boat on Wood creek was raised at an expense of \$121.51.

The slope wall on the twelve mile level was repaired, and cost \$90.81.

A new ice-breaker, and a new scow for the purpose of repairs, have been constructed during the past season; they cost \$284.13. The bridges and bridge approaches on Wood creek and on the five mile level have been raised by the State, at a cost of \$236.92.

Wood creek was dredged out for a short distance, and cost \$74.25.

The expense to the State for lock tending, and the expenses for oil, repairs to lock gates, caulking waste-weirs, together with all other miscellaneous expenses, amount to \$430.69.

Accounts accruing under the former superintendent have been paid to the amount of \$25.78.

Structures to be rebuilt or thoroughly repaired are as follows: the bridge and bridge abutments at Smith's basin, the bridge at

Brown's, on the five mile level, new abutments to P. Adams' farm bridge, and quite a number of the lock gates.

Two boats sank, one on the 18th and one on the 19th of June last, upon the five mile level; they were old and too heavily laden. Amount expended by the superintendent of repairs.. \$4,196 07  
Amount paid repair contractor..... 4,442 15

Total for the year..... \$8,638 22

*The following are the amounts expended on the Champlain Canal for repairs during a series of years past:*

Years.	Section 1.	Section 2.	Section 3.	Total.
1851,....	\$23,870 27	\$16,844 49	\$10,252 07	\$50,966 83
1852,....	37,611 43	19,246 62	18,660 96	75,519 01
1853,....	38,225 47	18,791 71	21,946 18	78,963 36
1854,....	31,025 06	24,894 34	16,663 01	73,463 48
1855,....	48,756 85	24,083 28	17,543 08	90,383 21
1856, ...	21,191 60	11,647 30	12,535 30	45,374 20
1857, ...	54,357 76	9,574 78	8,707 77	72,640 31
1858,....	42,386 75	24,561 20	14,111 21	81,059 16
1859,....	37,306 00	15,726 39	11,843 37	64,875 76
1860,....	26,997 46	16,621 80	12,401 70	56,020 96
1861,....	12,305 84	11,488 99	4,952 97	28,747 80
1862,....	16,752 47	10,666 85	8,668 22	36,087 54

### BLACK RIVER CANAL.

This canal is divided into two superintendent sections; a third section is formed by the Black river improvement. The whole canal, river improvement, feeders and reservoirs were, until February 3d, 1862, superintended by Lemuel W. Bowdish, when Griffith J. Griffith was appointed.

#### SECTION No. 1.

This section extends from the junction of the Black River canal with the Erie canal, at Rome, to a point one thousand feet north of lock No. 70, and is about twenty-four miles in length.

The following are the structures upon this section:

70 lift locks,

5 waste-weirs,	1 guard lock,
15 road bridges,	10 culverts,
2 road and change bridges,	
2 draw bridges across Delta feeder,	
19 lock houses,	3 aqueducts,
1 aqueduct over Rome and Ogdensburgh railroad,	
18 farm bridges,	
2 farm bridges, owned and supported by individuals.	

The contract for the repairs of this section was let to Edward H. Edwards, for the term of four years and eight months, commencing May 1st, 1861, at \$8,700 per annum.

The locks and lock gates upon this section were in very bad condition at the close of the last season, and required a large amount of repairs.

*New structures.*—Three new bridge superstructures have been put up, and four abutments have been rebuilt. The waste-weir on the three mile level, and the bridges over the waste-weir at Hulbertsville, and lock No. 63, have been built anew. The sluices at locks Nos. 52 and 54 have been reconstructed, and the docking at the head of lock No. 70 considerably repaired.

A new box drain has been constructed at Delta feeder; it cost \$254.12.

An improvement in Willis brook aqueduct, under direction of the Canal Board, was made by removing one of the piers in the stream to allow the free passage of ice, and by the construction of a trunk to carry the water; it cost \$683. An iron bridge superstructure was built over the junction of the Black River and Erie canals, at Rome, in place of the old wooden structure. The State, under the authority of the Canal Board, paid \$1,640, the difference between the cost of a new wooden and iron superstructure; the residue was paid by the contractor for repairs.

Ten new lock-gates have been put in, and the banks of the canal, and structures upon it, have been considerably repaired, as by report of the superintendent.

Some of the structures have been neglected and allowed to get out of repair, and, unless they are put in proper repair during the winter and spring, will cause great hindrance and delay in navigation the coming season.

The lock-gates, valves and sluices are in a very dilapidated condition, and are, some of them, almost useless. The necessary repairs upon this section may delay the opening of this canal for

two weeks after the opening of navigation on the other canals of the State.

The dam across the Mohawk river at Delta feeder, will have to be raised about a foot so as to supply the necessary quantity of water during the dry season to the canal.

*Breaches.*—A breach occurred in the towing path bank between locks No. 31 and 32, caused by the washing of the banks by the Lansingkill creek. Other delays have arisen from time to time from the bad condition of the lock-gates, the formation of bars in the channel of the canal by the washing of the streams entering the canal, and from other causes.

Amount expended by superintendents of repairs, . . .	\$1,114 42
Amount paid repair contractor.....	10,868 56

Total for the year.....	\$11,982 98
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#### SECTION No. 2.

This section commences at a point one thousand feet north of lock No. 70, and extends to the junction with the Black river at Lyons' Falls, a distance of twelve miles. It includes the Boonville feeder to Forestpost, a distance of ten and a half miles; also, the land above the dam at Forestpost, some two miles in length, and the Mohse river improvement above the dam at Lyons' falls, one and one-half miles long.

The contract for the repairs of this section was let to Benjamin F. Maxson, for the term of five years, commencing March 1, 1861, at \$4,178 per annum.

The following are the structures upon this section:

- 39 lift locks,
- 1 guard lock,
- 13 lock houses,
- 1 aqueduct,
- 6 waste weirs,
- 10 culverts,
- 2 dams,
- 16 road bridges,
- 22 farm bridges,
- 1 farm and change bridge,
- 1 road and change bridge,
- 1 towing-path bridge.

Upon this section the canal in general and the mechanical structures in particular have not been kept in as good order as they should have been, and must, before the opening of navigation, have thorough repairs. To make these repairs, and put the canal in good condition, a delay of one or two weeks after the usual time of opening will be necessary.

From time to time detentions have been caused by the bad condition of the canal and of the mechanical structures upon it, and the bars in the feeder which had not been taken out or have formed during navigation.

*Structures repaired.*—The superstructures of several bridges have been rebuilt, and quite a number have been repaired. Three new abutments have been put up.

Near the opening of navigation last spring a breach occurred at the head of lock No. 102, by which a sluice way and a portion of the towing-path was washed out. It was repaired in twenty-four hours.

A sink hole, near the head of Sugar river combined locks, has been caused by the washing of the river through the crevices in the rocks. It has been repaired several times during the season, but the repair can only be made permanent by grouting the seams of the rocks. And this can be done only at a time when the water is drawn from the canal.

An abandoned boat sank near lock No. 97, it was removed with but little delay.

The reservoirs at the head waters of the Black river have, this season, furnished material aid to navigation. They are three in number—the North, and South Branch, and the Woodhull reservoirs, they have each furnished their full quota, and have, together, supplied all the water necessary for the use of the Black River canal, and a very large quantity to the Erie canal.

For the protection of the reservoirs and their waters, a house should be built for the use of the man having charge of them, on North Branch reservoir, which is about midway between South Branch and Woodhull reservoirs. It should cost not to exceed five hundred dollars.

Amount expended by the superintendents of repairs	\$858 85
Amount paid repair contractor .....	4,136 50
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Total for the year .....	\$4,995 35
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## SECTION No. 3,

Includes the Black river improvement from Lyons' Falls to Carthage, a distance of  $42\frac{1}{2}$  miles, and the repairs are contracted for by Ward & McVickar, for \$3,800 per annum; their contract expires November 1, 1864.

The following are the structures upon this section :

- 1 road bridge at Carthage,
- 1 draw to Beach's bridge,
- 1 draw to Illingsworth's bridge,

Dam at Carthage.

At the opening of the canal last spring navigation was delayed four or five days by the formation of a heavy bar during the winter at the mouth of the lock at Otter creek. The bar is formed from the material carried down by Otter creek, which runs directly across the canal to the mouth of the lock, which has no protection from the current by a pier or otherwise.

The dredge was engaged three weeks in removing the bar so boats could pass without grounding. During the season the dredge was obliged to return twice to this bar and dredge it out. The least rise in the water of the creek has a tendency to fill up the channel. A pier for the protection of the channel should be built; such a one as is necessary, by the estimates of D. C. Jenne, Engineer, might be built for \$5,000.

A portion of the dam at Otter creek and the west abutment became badly undermined. About fifty feet of the dam sank from three to four feet, and the abutment settled over ten inches. The dam has been repaired by cribs of timber filled with stone, and the abutment has been repointed and grouted so as to fill the seams and cracks made by the settling.

The breach was caused by an imperfect graveling when the work was in process of construction. It was repaired by the State, and cost \$742.50.

Some plan differing from the present must be devised to maintain perfect navigation between Otter creek and Beech's bridge. If a plan similar to that at Otter creek was adopted, there would be no difficulty or detention.

Amount expended by the superintendents of repairs	\$3,856 31
Amount paid repair contractors.....	3,795 00
Total for the year.....	<u><u>\$7,651 31</u></u>

*The following are the amounts expended on the Black River Canal, and Black River Improvement, for repairs, for a series of years past.*

Years.	Section 1.	Section 2.	River Imp.	Total.
1851,....	\$7,127 35	\$15,574 18	-----	\$22,701 53
1852,....	8,370 56	22,240 37	-----	30,610 93
1853,....	6,895 85	19,324 03	-----	26,219 88
1854,....	12,321 43	16,256 82	-----	28,578 25
1855,....	9,347 28	24,514 40	-----	33,861 68
1856,....	4,826 55	12,377 18	-----	17,203 73
1857,....	3,935 68	9,860 97	-----	13,796 65
1858,....	3,999 00	14,622 75	-----	18,621 75
1859,....	8,107 70	16,818 03	-----	24,925 73
1860,....	4,821 54	14,724 85	\$2,741 55	22,287 94
1861,....	9,962 37	9,639 59	3,799 92	23,401 88
1862,....	11,982 98	4,995 35	7,651 31	24,629 64





*The following table shows the depth of water upon the mitre-sill of the locks upon each of the canals of the Eastern Division, as measured monthly, and reported by the superintendents of repair.*

## ERIE CANAL.

	October.		Novem.		May.		June.		July.		August.		Sept.	
	Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.
Mitre sill :														
Lock 1 ----	7	0	7	0	6	10	6	11	6	10	6	11	6	11
do 2 ----	7	0	7	0	7	0	7	0	7	0	7	0	6	11
do 3 ----	7	0	7	0	7	0	7	0	7	0	7	0	7	0
do 4 ----	7	0	7	0	7	0	7	0	7	0	7	0	7	0
do 5 ----	7	0	7	0	7	0	7	0	7	0	7	0	6	11
do 6 ----	7	0	7	0	7	0	7	0	7	0	7	0	6	10
do 7 ----	7	0	7	0	7	0	7	0	7	0	7	0	6	11
do 8 ----	7	0	7	0	7	0	7	0	7	0	7	0	6	11
do 9 ----	7	0	7	0	7	0	7	0	7	0	7	0	7	0
do 10 ----	7	0	7	0	7	0	7	0	7	0	7	0	6	11
do 11 ----	7	0	7	0	7	0	7	0	7	0	7	0	6	11
do 12 ----	7	0	7	0	7	0	7	0	7	0	7	0	6	10
do 13 ----	6	11	7	0	7	0	7	0	7	0	7	0	6	11
do 14 ----	7	0	7	0	7	0	7	0	7	0	7	0	6	11
do 15 ----	7	0	7	0	7	0	7	0	7	0	7	0	6	10
do 16 ----	7	0	7	0	7	0	7	0	7	0	7	0	6	11
do 17 ----	7	0	7	0	7	0	7	0	7	0	7	0	7	0
do 18 ----	7	0	7	0	6	9	6	8	7	0	7	0	6	9
do 19 ----	6	10	6	10	6	8	6	7	6	9	6	10	6	8
do 20 ----	7	0	6	10	7	0	7	0	6	8	6	9	6	9
do 21 ----	7	0	7	0	7	0	7	0	7	0	7	0	6	6
do 22 ----	6	9	7	0	6	8	6	9	6	8	6	9	7	0
do 23 ----	7	0	6	8	7	0	7	0	7	0	7	0	6	6
do 24 ----	7	0	7	0	7	0	7	0	7	0	7	0	7	0
do 25 ----	7	0	7	0	7	0	7	0	6	11	7	0	6	10
do 26 ----	7	0	6	10	7	0	7	0	6	10	6	11	6	7
do 27 ----	7	0	7	0	7	0	7	0	7	0	6	11	7	0
do 28 ----	6	10	6	10	6	10	6	10	7	0	7	0	7	0
do 29 ----	7	0	6	9	7	0	7	0	7	0	7	0	6	5
do 30 ----	6	10	6	8	7	0	6	10	6	10	6	11	6	6
do 31 ----	6	10	6	10	6	8	6	9	6	8	6	9	6	8
do 32 ----	6	9	6	10	6	8	6	10	6	9	6	9	6	9
do 33 ----	6	10	6	9	7	0	7	0	6	10	6	11	6	6
do 34 ----	---	---	---	---	7	0	7	0	7	0	7	0	7	0

ANNUAL REPORT OF THE  
ERIE CANAL.—Continued.

	October.		Novem.		May.		June.		July.		August.		Sept.	
	Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.
Mitre sill :														
Lock 34.....	7	3	7	3	7	0	7	0	7	3	7	2	7	3
do 35.....	7	0	7	0	7	0	7	0	7	0	7	0	7	0
do 36.....	7	0	7	0	7	0	7	3	7	0	7	0	7	0
do 37.....	7	0	7	0	7	0	7	0	7	0	7	0	7	0
do 38.....	7	0	7	0	7	0	7	4	7	0	7	0	7	0
do 39.....	7	0	7	0	7	0	7	0	7	0	7	4	7	6
do 40.....	7	6	7	6	7	6	7	0	7	3	7	0	7	0
do 41.....	7	0	7	0	7	0	7	0	7	2	7	0	7	0
do 42.....	7	0	7	0	7	0	7	0	7	0	7	0	7	0
do 43.....	7	0	7	0	7	0	7	0	7	0	7	0	7	0
do 44.....	7	0	7	0	7	0	7	0	7	0	7	0	7	0
do 45.....	7	0	7	0	7	0	7	0	7	0	7	0	7	0
do 46.....	7	0	7	0	7	0	7	0	7	2	7	0	7	0
Utica 9-m lev.	7	0	7	0	6	10	7	0	6	9	6	10	6	0
do 60-m lev.	7	0	7	0	6	10	6	9	6	9	6	10	6	9
Taft's w. wier:														
60-m. level..	7	0	7	0	6	10	6	9	6	9	6	10	6	9
Rome 60-m lev	7	0	7	0	6	10	6	9	6	9	6	10	6	9
Ft. Bull w. w.:														
60-m. level..	7	0	7	0	6	10	6	9	6	9	6	10	6	9

CHAMPLAIN CANAL.

	Oct.	Nov.	May.	June.	July.	Aug.	Sept.
	Ft.In.	Ft.In.	Ft.In.	Ft.In.	Ft.In.	Ft.In.	Ft.In.
South side Mohawk river .....	5 04	9 5	34 35	104 94	11		
North side Mohawk river .....	4 114	0 5	04 45	83 83	11		
Waterford side-cut, old lock..	7 35	0 6	25 95	34 64	10		
do Main st. bridge.....	4 94	8 5	0 5	04 94	14 5		
3½-mile level, Cold Sp'g creek..	5 75	1 5	0 5	04 114	94 10		
8¼-m. l., Gardner's road bridge.	5 95	4 5	1 5	1 5	04 115	0	
1-mile level, Cole's waste weir.	5 04	10 5	0 5	0 5	14 84	9	
4-m. l., Best's farm bridge.....	4 55	6	5 25	15 04	84 10		
do Mechan'ville R. R.	4 64	6 5	2 5	15 04	74 8		
16-mile level, Rudd's basin...	5 05	0 5	3 5	1 5	04 64	7	
do Bemis H'ts w. weir.	6 05	11 5	2 5	2 5	04 64	6	
do Salisb'y's road b'ge	4 45	10 5	3 5	24 114	91 10		
do Schuyler'lle aqued.	5 65	3 5	5 5	3 5	6 5	3 5	2
Hudson river, Rich. House...	6 74	9 6	1 5	4 6	0 5	8 5	9
do north of bridge...	4 116	10 5	2 5	1 6	0 5	9 5	10
2-mile level, Suttin's bridge ..	5 55	3 5	3 5	4 5	2 5	0 5	1
1-m. l., Ft. Miller waste weir ..	5 05	0 4	8 4	9 4	10 4	9 4	8

## CHAMPLAIN CANAL.—Continued.

	Oct.	Nov.	May.	June.	July.	Aug.	Sept.
	Ft.In.	Ft.In.	Ft.In.	Ft.In.	Ft.In.	Ft.In.	Ft.In.
1-m. l., Lincoln's foot bridge...	4 9	---	4 84	94 104	104 104	104 11	
5-m. l., Rock cut .....	4 84	14	84 94	104 94	94 9		
5-m. l., Ft. Edward bridge .....	---	---	5 25	15 35	105 1		
Glens Falls feeder .....	5 45	45 15	05 05	25 04	1		
do upper lock .....	5 04	05 85	105 95	65 5			
do Brown's bridge .....	5 05	04 44	74 54	54 5			
do Green's bridge .....	---	4 114	94 104	94 10			
12-mile level, Dunham's basin.	5 05	15 35	55 45	25 1			
12-m. l., Barker's foot bridge .....	---	5 05	15 15	05 0			
Wood Creek, R.R. b'ge, Ft. Ann .....	---	7 87	17 06	36 2			
do Dewey's b., S. new lock .....	---	9 28	58 38	08 0			
do Wood's farm bridge .....	---	8 27	97 57	27 1			
5-m. l., Lockwood farm bridge .....	---	5 05	05 04	114 10			
5-m. l., Whitehall change b'ge .....	---	5 45	45 04	104 9			

## BLACK RIVER CANAL.

Mitre sill of lock No. 1 .....	4 65	04 84	104 84	8		
do do 2 .....	4 74	84 64	64 44	6		
do do 3 .....	4 74	84 44	64 64	6		
do do 4 .....	4 84	64 44	44 64	8		
do do 5 .....	4 84	34 64	34 34	7		
do do 6 .....	4 64	44 24	44 04	4		
do do 7 .....	4 74	04 34	74 24	6		
do do 8 .....	4 44	64 04	64 44	4		
do do 9 .....	4 44	44 01	44 44	8		
do do 10 .....	4 54	84 44	34 24	4		
do do 11 .....	4 44	54 34	54 44	3		
do do 12 .....	4 54	34 64	44 54	4		
do do 13 .....	4 44	74 44	64 04	6		
do do 14 .....	4 54	04 24	84 24	6		
do do 15 .....	4 64	84 34	44 34	7		
do do 16 .....	4 54	34 44	54 64	4		
do do 17 .....	4 44	64 44	64 64	2		
do do 18 .....	4 64	64 54	44 34	3		
do do 19 .....	4 34	24 34	34 04	0		
do do 20 .....	4 44	64 54	44 04	2		
do do 21 .....	4 54	04 04	84 34	4		
do do 22 .....	4 44	24 24	64 54	6		
do do 23 .....	4 54	64 04	34 74	3		
do do 24 .....	4 44	54 04	44 64	6		
do do 25 .....	4 44	34 24	24 44	8		
do do 26 .....	4 64	24 64	04 44	6		
do do 27 .....	4 54	44 04	34 54	4		

ANNUAL REPORT OF THE  
BLACK RIVER CANAL.—Continued.

			Oct.	Nov.	May.	June.	July.	Aug.	Sept.
			Ft.In.	Ft.In.	Ft.In.	Ft.In.	Ft.In.	Ft.In.	Ft.In.
Mitre sill of lock No.	28	-----	4	54	64	44	44	64	4
do	do	29	4	64	64	34	64	64	8
do	do	30	4	84	64	64	64	34	6
do	do	31	4	84	04	34	24	44	6
do	do	32	4	54	24	44	33	104	5
do	do	33	4	94	34	24	44	44	2
do	do	34	4	54	54	44	34	24	2
do	do	35	4	54	24	24	04	44	2
do	do	36	4	44	84	04	24	64	0
do	do	37	4	34	04	34	44	64	3
do	do	38	4	44	44	04	44	44	4
do	5 combined	43	4	44	64	04	24	04	3
do	3 combined	46	4	54	64	104	34	24	4
do	do	47	4	44	64	04	04	34	3
do	do	48	4	44	04	04	34	44	5
do	do	49	4	64	44	34	64	64	4
do	do	50	4	54	34	44	44	44	6
do	do	51	4	44	24	44	64	64	4
do	do	52	4	34	64	64	34	34	5
do	do	53	4	24	64	04	24	04	6
do	do	54	4	34	44	24	04	04	4
do	do	55	4	44	34	24	34	94	0
do	do	56	4	44	44	44	54	04	2
do	do	57	4	44	64	64	44	24	0
do	3 combined	60	4	54	34	44	64	44	4
do	do	61	4	64	54	34	34	44	2
do	do	62	4	74	74	24	04	64	3
do	do	63	4	64	64	04	34	54	6
do	do	64	4	64	84	34	64	04	8
do	do	65	4	54	54	34	44	44	6
do	do	66	4	64	84	04	24	44	4
do	do	67	4	34	84	24	04	24	4
do	do	68	4	54	74	04	24	34	6
do	do	69	4	44	84	44	64	44	4
do	do	70	6	06	04	44	64	64	6
do	do	71	4	64	04	64	105	05	0
do	do	72	4	64	04	44	64	64	8
do	do	73	4	64	64	84	44	44	8
do	do	74	4	64	44	34	64	64	6
do	do	75	4	54	04	44	64	54	6
do	do	76	4	54	04	44	34	64	4
do	do	80	4	45	04	94	04	04	2
do	do	81 to 84	4	44	04	94	84	64	6

## BLACK RIVER CANAL.—Continued.

	Oct.	Nov.	May.	June.	July.	Aug.	Sept.
	Ft.In.	Ft.In.	Ft.In.	Ft.In.	Ft.In.	Ft.In.	Ft.In.
Mitre sill of lock No. 85.....	4	4 4	6 4	4 4	4 4	4 4	4
do do 86.....	4	4 4	6 4	5 4	3 4	5 4	4
do do 87.....	4	4 4	6 3	10 4	0 4	3 4	4
do combined 91.....	4	5 4	8 4	4 4	6 4	4 4	6
do do 92.....	4	4 4	6 4	4 4	6 4	6 4	8
do do 93.....	4	4 4	0 4	2 4	4 4	0 4	6
do do 94.....	4	4 4	3 4	4 4	3 4	0 4	6
do do 95.....	4	3 4	6 4	2 4	0 4	3 4	4
do do 96.....	4	4 4	3 4	4 4	3 4	6 4	6
do do 97.....	4	5 4	3 4	0 4	2 4	4 4	7
do do 98.....	4	4 3	10 4	2 4	4 4	6 4	5
do combined 101.....	4	5 4	0 4	0 4	3 4	0 4	4
do do 102.....	4	4 4	0 4	0 4	2 4	3 4	6
do combined 105.....	4	3 4	0 4	2 4	4 4	6 4	4
do do 107.....	4	4 4	6 4	3 4	7 4	8 4	6
Feeder near State shop.....	4	6					4 10
Feeder near Pitcher's bridge.....	4	8					
Feeder at Hawkinsville.....	4	5					4 8
Feeder at stop gate near Lee's.....	4	5					4 3
Feeder at Grossman's.....	4	3					
Feeder at upper waste weir.....	4	3					4 4

ENGINEER'S OFFICE, EASTERN DIVISION, }  
ALBANY, Dec. 9th, 1862. }

HON. WM. I. SKINNER, Canal Commissioner :

Sir : I have prepared statements showing the condition and progress of work on the several canals on the eastern division for the fiscal year ending Sept. 30th, 1862, which are herewith presented in Tables Nos. 1 and 2. They refer to work which has been under the supervision of the Engineer Department, and embrace both construction and repairs.

On the enlargement of the Erie canal the work under contract is all completed and the final accounts closed, with the exception of Secs. Nos. 60 and 62, the finals of which are completed and ready for settlement.

By act, chap. 169, Laws of 1862, the construction accounts of the enlargement were closed on the 1st of September, and all necessary work must be brought under the head of repairs. There are many points where improvements are necessary in order to make good navigation, facilitate the transaction of business, and prevent hindrances and delays, with the present increase of business.

On the level at Albany, between Locks Nos. 1 and 2, the canal was constructed on the old plan, with the bench walls, which prevent boats coming near the towing path to unload. It would aid very much to the transaction of business if vertical walls, with a single stick of docking on top, were put in on a portion of this level, and all of it thoroughly bottomed out. The superstructure of the Ferry street bridge in the city of Albany should be rebuilt this winter. I would recommend that an iron bridge ("Whipple's Trapezoidal Truss") should be built in place of the present wood covered bridge.

At West Troy, for at least three-quarters of a mile, in the vicinity of the side-cut, a vertical wall is very necessary on the towing path side, to facilitate the passage of boats and prevent crowds and jams which frequently occur. This part of the canal is also on the plan of the bench wall, which should all be removed.

The level at West Troy has been very much relieved by the construction of a weighlock at Waterford, so that all boats from the Champlain canal are weighed at the latter place, instead of West Troy, as heretofore.

Much detention occurs at the Sixteen locks in the vicinity of Cohoes, in consequence of the plank foundation being forced up in the chamber of the lock by the pressure of water from the other lock when full; the foundations of the same being connected through under the culvert. These locks were all built prior to 1842, and no concrete was used in the foundations.

It is important that each lock should be thoroughly repaired before the opening of navigation, by concreting the foundations.

The change bridge at the foot of lock No. 22, near the upper Mohawk aqueduct, is located very badly for the convenience of navigation, and should be changed to a point below the entrance of the feeder below lock No. 21.

This would require a new towing path bank or bridge across the basin on the level between the two locks.

The wing dam for the Mohawk feeder at the upper aqueduct is in rather a dilapidated condition, and is in bad shape with the general current of the river, being subject to the force of the river lengthwise, and must always be expensive in its repairs.

When a new dam is required, it seems to me to be sound policy to construct a stone dam directly across the river from the bulkhead. The foundation would be on rock, and the height would not be more than eight feet, the length from six to seven hundred feet.

The stone dam at Schoharie creek is complete, and is a very valuable improvement, as all the water of the creek, in a dry time, can be forced into the canal, and will be an abundant supply for the same to the upper Mohawk aqueduct.

The canal has had the full benefit of the Schoharie creek during the dry part of the season, by means of the coffer dams used in the construction of the dam.

The head of the guard lock for the Schoharie creek feeder should be raised two feet and a bulkhead put in (to take the place of the old lock gates) with an increased number of valves, or those of larger area, in order to pass the quantity of water required. This work should be done before the opening of navigation next spring.

From Schoharie creek to Castle creek there is a very considerable portion of the canal which was enlarged prior to 1842, and has the bench wall.

In many places the towing path is worn down, by its constant use for twenty years, and requires raising; and a large amount of material from the top of the towing path has been drawn into the canal by the tow lines, there being no wall or pavement to prevent, and most of this material lies at the bottom angle, and should be removed. The same is applicable to portions of the canal from Castle creek to Little Falls, and from Little Falls to Utica.

The interest of the State and of those navigating the canals require that those portions of the canal built on the original plan, with the bench wall, should be improved, and the towing path made to conform to the plan adopted in 1850 for the enlargement. If this was done, and the bottom thoroughly cleaned out at these points, many of the delays of boats which now occur would be avoided.

From Utica to Higginsville, with the exception of two miles at

Rome, the canal is in good condition, having been built on the plan of slope walls from bottom of canal. The only delays which have occurred on this part of the canal have been from a lack of water to keep up the level west of Utica at certain times in the year, which is doubtless caused by too large a portion of the water taken in at Rome from the Mohawk and Black rivers being required west of that point. This fact demonstrates the necessity of the proposed feeder from Fish creek, which without doubt will have to be brought in at some future time not far distant.

#### CHAMPLAIN CANAL.

Since the last annual report the south guard lock at Cohoes, the weigh lock and fixtures at Waterford, and Parish lock (No. 17), on Wood creek, have been completed and brought into use. The dam across the Mohawk, at Cohoes, has been raised  $1\frac{1}{2}$  feet, and a stone dam has been nearly completed across Wood creek, near Parish lock.

The contract for driving piles on 16 and 5 mile levels is very near completed.

Contracts were made for stopping leaks on the Glens Falls feeder, including about  $1\frac{3}{4}$  miles of that portion which passes over the limestone rock, in the vicinity of Glens Falls. A large quantity of water has heretofore been wasted through the crevices in the rock at this point, making such a current as was almost impossible to navigate the same. Large sums of money have been expended to stop the crevices and prevent the waste of water, but to no purpose. The plan now adopted is to excavate the bottom and sides, and put in a vertical wall, in mortar, on each side, and a concrete or rubble wall in the bottom. About 32 chains of this work was completed last spring, and operates with almost perfect success; the balance will be completed the coming spring, when it is believed that the entire object will be accomplished. This part of the feeder is made 35 feet wide on bottom and 5 feet deep, as required by act, chap. 213, Laws of 1860.

It is very important that the locks at Fort Miller, Moses kill, and Fort Edward should be rebuilt during the coming year. The surveys and location of the same have been made and adopted by the Canal Board. The two latter can be built during the summer season, as they have new locations, but the former must be rebuilt on the original site and the work put in



during the suspension of navigation; but the materials can all be delivered during the summer.

The high bank on this canal below Coveville requires protecting to a considerable extent, as three serious breaks have occurred at this point within the last few years, and during the last year. The character of the materials of which the bank is composed is very bad, and the prism of canal for several hundred feet is from 10 to 16 feet below bottom. The prism should be filled up, and the bottom and sides lined with good material, and the face of towing path protected by a substantial slope wall, or by a concrete wall, and the outside with a rip-rap wall at foot of slope.

The banks of this canal are generally very low for the quantity of water that is maintained there; and the time is not far distant when it will be necessary to make extensive improvements in the same, in order to keep the canal in a condition for doing the constantly accumulating business.

#### BLACK RIVER CANAL.

All the work on this canal under contract is completed and settled up, excepting the bridges across Black river, at Carter's ferry and Tiffany's landing, which are being built under a special law, and will be both completed this fall and settled by the 1st of March.

Some improvements are necessary at different points to make good navigation. On the main canal there are many places where deposits are made from small streams running into the canal from steep side hills, particularly along the Lansing kill, where the material is slate gravel, and easily moved by the action of water. Some of these cannot be obviated without great expense, and the only way is to have the bars immediately removed by the repair contractor. At other points the deposits can be carried under the canal by building a culvert, or into streams by cutting a ditch by the side of canal.

The dam across the Mohawk river at Delta has settled so that in low water the quantity of water designed to be passed through the Delta feeder cannot be obtained. It will be necessary to raise the dam about one foot, and repair the same thoroughly, in order to make the feeder available for its designed use, to supply the canal from lock No. 9 to the Erie canal, and save passing so

large a quantity of water through the canal from the Lansing kill feeder, at lock No. 34, to this point. The guard lock at the head of the feeder is partially filled up, and the channel, above the lock, into the river, also requires cleaning out, in order to admit a free passage of water, and to allow boats to pass.

The canal is in fair condition from Rome to Lansingkill aqueduct. From thence to south end of summit many of the locks and the sluices around the same have been very seriously neglected, and, if not put in good repair in a short time, will become of no use. The gates are much dilapidated, and the valves in the same leak very badly. The culvert valves in the combined locks are not used for want of repair, and the sluices to some of the locks are almost useless.

A much larger quantity of water has been passed through this part of the canal than was necessary to feed it, instead of passing it off at the waste-weir at south end of summit into the Lansing kill, as originally designed. All the water from Black river to supply the Erie canal at Rome was to be passed out at this waste weir into Lansing kill, except what was necessary to supply the Black River canal, but it seems that in order to keep up the water in the lower end of the Black River feeder, the waste timber at the weir has been raised, which forces more water than is necessary down the canal; this should not be allowed.

The feeder has become filled up at various points in its entire length, so that boats drawing a regular amount of water cannot navigate the same, without raising the water above its usual height, and the required amount of water for the Erie canal cannot be passed through. It is very important that all the different points on the feeder should be bottomed out before the opening of navigation next spring, and as the ice and snow usually remains in the feeder longer than in the other canals, it may be well to delay the opening of this canal for a week or two in the spring, in order to have this work done, and to clean out the bars on the main canal, and fix the sluices and valve gates to the locks.

The canal from Boonville to Lyons Falls is usually in very good condition, except the valves to lock gates, which leak very badly, and the culvert valves to the combined locks, which are not used at all, being out of repair.

These cause a much larger amount of water to be taken north

from summit than is necessary, and divert water from the Erie canal.

The navigation on Black river, from Lyons Falls to Otter creek, has been in good order most of the season. From the latter place to Illingworth's bridge, there has been considerable difficulty at times, at different points, in navigating the same, in consequence of shoal water and trouble with the snags in the bottom.

The lock at Otter creek is so located that in time of floods, the water of the creek strikes directly across the channel at the foot of lock, and fills up the same with sand and other deposit. This has kept the dredging machine used by the repair contractor at work for a considerable portion of the time at this point, and prevented them doing all the necessary work in other parts of the channel below. In order to avoid this filling up, a pier will have to be extended down some 300 feet below the wing of the lock on the river side, and raised above high water; and guard banks put in on the land side, about 500 feet long, and on the river side of lock embankment, about 200 feet long. Unless this work is done this winter the channel will be filled up in the spring, and cause delay in navigating the river.

Some plan will have to be devised different from the present one, to make good navigation from Otter creek to a point about two miles below Beach's bridge, in seasons of great drought, as has been the past season.

The reservoirs located at the head waters of Black river have answered the purpose designed during the past season, and have been used to their utmost capacity.

In my opinion it is very important that Chub Lake reservoir, which was once adopted and commenced, should be built at an early day. This will add about one-third to the quantity of water now reserved for the use of the Black River and Erie canals.

I would recommend that a good dwelling-house should be built at the North Branch reservoir, at a cost of \$500, for the use of the man who has charge of all the reservoirs, and that he should be required to spend his whole time in looking after the same, particularly in the spring of the year, when the high floods occur; also, that he should be required to keep accurate notes of the condition of each reservoir, from day to day, as he may visit them, during the year, such as may be prescribed by the State Engineer and Surveyor and Canal Commissioner, and make monthly reports of the same to both Departments.

I have had measurements taken of all the mechanical structures on the Erie canal, on the Eastern Division, and have carefully prepared a table of the same, which is annexed at the end of the volume, giving the general details of all the mechanical structures on this division.

All of which is respectfully submitted.

DANIEL C. JENNE,

*Engineer, Eastern Division.*

TABLE No. 1.

STATEMENT showing the character of work, estimated cost at contract prices, amount of work done during the fiscal year ending September 30th, 1862; whole amount done, and amount remaining to be done under existing contracts on the Eastern Division of the New York State Canals.

Character of work.	Estimated cost at contract prices.	Amount done from Oct. 1, 1861, to Oct. 1, 1862.	Whole amount done.	Amount remaining to be done.
<b>ENLARGEMENT OF THE ERIE CANAL.</b>				
Sections Nos. 41, 42, 43 and 44.....	\$28,969 98	\$3,799 98	\$28,969 98	Settled.
do 45, 46 and 47.....	34,055 83	725 83	34,055 83	do
do 60.....	42,303 16	5,363 16	42,303 16	Completed.
do 62.....	129,948 86	7,448 86	129,948 86	do
Completion of enlargement from west end of section 47 to lock No. 29....	10,352 24	2,472 24	10,352 24	Settled.
Bottoming canal below and raising banks above lock No. 34, and raising banks between locks No. 39 and 40.	21,014 87	2,274 87	21,014 87	do
Bottoming canal below lock No. 42, and raising banks on section 127...	2,154 78	94 78	2,154 78	do
Bottoming the Erie canal through the city of Utica.....	10,680 83	890 83	10,680 83	do
Raising banks on sections Nos. 83 and 84, and bottoming canal on section No. 84.....	2,352 35	952 35	2,352 35	do
Raising bridge superstructures on superintendent section No. 1.....	3,912 78	402 78	3,912 78	do
Raising bridge superstructures on superintendent section No. 2.....	5,682 97	972 97	5,682 97	do
Raising bridge superstructures on superintendent section No. 3.....	3,373 10	293 10	3,373 10	do
Raising bridge superstructure on superintendent section No. 4.....	2,120 12	150 12	2,120 12	do
Raising bridge superstructures on superintendent section No. 5.....	7,527 22	1,077 22	7,527 22	do
Bridge abutments on sections Nos. 33 and 35.....	6,837 15	1,127 15	6,837 15	do
Vertical wall on section No. 108, in the city of Utica.....	8,672 66	8,672 66	8,672 66	do
Iron trapezoidal bridge superstructure over Erie canal in Van Vliet street, Cohoes.....	3,000 00	3,000 00	3,000 00	do
Raising banks and bottoming canal at the west end of repair section No. 3.	6,594,28	6,594 28	6,594 28	do
	<b>\$329,553 18</b>	<b>\$45,313 18</b>	<b>\$329,553 18</b>	
<b>REPAIRS OF THE ERIE CANAL.</b>				
Rebuilding Schoharie creek dam....	\$22,000,00	\$11,320 00	\$17,140 00	\$4,860 00
Removing big bevels from locks on superintendent sec. No. 2.....	1,787 50	212 50	1,787 50	Settled.
Repairs of arch culvert on section No. 30.....	3,179 10	3,179 10	3,179 10	do
	<b>\$26,966 60</b>	<b>\$14,711 60</b>	<b>\$22,106 60</b>	<b>\$4,860 00</b>

TABLE No. 1.—Continued.

Character of work.	Estimated cost at contract prices.	Amount done from Oct. 1, 1861, to Oct. 1, 1862.	Whole amount done.	Amount re- maining to be done.
<b>CHAMPLAIN CANAL.</b>				
Rebuilding Bassett lock (No. 10) en- larged .....	\$14,823 36	\$163 36	\$14,823 36	Settled.
Rebuilding Parish lock (No. 17) on Wood creek (including dam).....	20,000 00	18,370 00	18,370 00	\$1,630 00
Rebuilding south guard lock at Co- hoes .....	14,274 40	14,274 40	14,274 40	Completed.
Weigh lock and weigh master's office at Waterford.....	22,115 70	19,075 70	22,115 70	do
Scale for weigh lock at Waterford....	3,500 00	3,500 00	3,500 00	Settled.
Culvert and coffer dam for weigh lock at Waterford.....	3,499 69	1,649 69	3,499 69	do
Driving piles on 16 and 5 mile levels.	18,180 00	4,430 00	14,050 00	4,130 00
Stopping leaks on Glens Falls feeder, section No. 1.....	25,474 00	12,050 00	12,050 00	13,424 00
Stopping leaks on Glens Falls feeder, section No. 2.....	21,334 00	6,710 00	6,710 00	14,624 00
	<u>\$143,201 15</u>	<u>\$80,223 15</u>	<u>\$109,393 15</u>	<u>\$33,808 00</u>
<b>BLACK RIVER CANAL.</b>				
Dam and lock at or near Otter creek..	\$44,421 91	\$7,531 91	\$44,421 91	Settled.
Bridge for Delta feeder.....	2,086 22	286 22	2,086 22	do
South branch reservoir .....	11,196 27	1,226 27	11,196 27	do
Bridge across Black river at Carter's landing .....	8,981 00	5,210 00	5,800 00	\$3,181 00
Bridge across Black river at Tiffany's landing .....	8,554 90	4,640 00	7,530 00	1,024 90
	<u>\$75,240 30</u>	<u>\$18,894 40</u>	<u>\$71,034 40</u>	<u>\$4,205 90</u>

TABLE No. 2.

STATEMENT showing total amount done on work not under contract, on the Eastern Division of the New York State Canals, from October 1st, 1861, to October 1st, 1862, as performed under the supervision of the Engineers.

Character of work.	Amount done.
<i>Erie canal.</i>	
Repairs of Sauquoit creek aqueduct.....	\$44 27
Building sewer in William St., Utica.....	167 14
Repairs of Whitehall creek culvert.....	140 00
Iron bridge superstructure over feeder at Little Falls.....	1,778 13
Farm bridge superstructure over Erie canal, in town of Danube.....	582 89
Raising abutments to feeder bridge at Little Falls	1,048 65
“ “ and embankments to iron bridge, Fultonville.....	326 24
Taking down, removing, and rebuilding change bridge at lower Mohawk aqueduct.....	1,206 00
Rebuilding and raising superstructure of Casler's farm bridge.....	264 20
Repairing berm bank near Printup's aqueduct....	181 50
For graveling bank on sec. No. 58.....	135 00
Total .....	<u>\$5,874 02</u>
<i>Champlain canal.</i>	
Construction of new pier at Emprey's waste weir.	\$24 32
Improvement of creek channel at Eastman's waste weir .....	894 67
Rebuilding waste weir at Smith's basin.....	204 88
Improvement of dam across Mohawk at Cohoes...	2,249 76
Total .....	<u>\$3,373 63</u>

*Black River canal.*

Box drain at Delta feeder.....	\$254 12
Improvement Willis brook aqueduct.....	683 00
Iron bridge superstructure at Rome.....	1,640 00
Total .....	<u>\$2,577 12</u>
Total for division.....	<u><u>\$11,824 77</u></u>

*Abstract of foregoing tables.*

	Estimated cost at con- tract prices.	Amount done from Oct. 1, 1861, to Oct. 1, 1862.	Whole am't done.	Amount re- maining to be done.
Enlargement of the Erie canal.....	\$329,553 18	\$45,313 18	\$329,553 18	.....
Repairs of the Erie canal.....	26,966 60	14,711 60	22,106 60	\$4,860 00
Miscellaneous .....		5,874 02		
Champlain canal.....	143,201 15	80,223 15	109,393 15	33,808 00
Miscellaneous .....		3,373 63		
Black River canal.....	75,240 30	18,894 40	71,034 40	4,205 90
Miscellaneous .....		2,577 12		
Totals.....	<u>\$574,961 23</u>	<u>\$170,967 10</u>	<u>\$532,087 33</u>	<u>\$42,873 90</u>

**EXTRAORDINARY REPAIRS AND IMPROVEMENTS.**

The closing of the enlargement and construction accounts of our public works on the first day of September last, by act chapter 169, of the Laws of 1862, left some of the construction contracts on our enlarged canals not fully completed, and consequently there are points upon the line of the Erie where a further outlay of money will be required to render the depth of water uniform on the whole line. No beneficial results to navigation can be obtained where the capacity for draft of water at one point of the line is six feet, and at other points only five feet and six inches.

The line of draft on all our enlarged public works should be uniform. Such was the intention and object of the laws authorizing their construction, and will not now be lost sight of.



It is understood that the Auditor's financial report will show a remainder of canal receipts for the last fiscal year after setting aside the sums charged upon them for the various constitutional sinking funds, which is subject to appropriation by the Legislature, to such objects as may be deemed expedient.

- I would therefore respectfully suggest an early appropriation of so much of this remainder as may be found proper to be expended under the direction of the Canal Board in such extraordinary repairs and improvements as the Board may direct.

An appropriation during an early period of the session will probably place funds at the disposal of the Commissioners to perform such work as will be needed before the opening of navigation next spring.

#### CHAMPLAIN CANAL.

It appears by an examination of the financial reports of the Canal Department, and of the appropriation and payments for the last four fiscal years, on account of this canal, that on the 30th of September, 1862, the appropriation had been overdrawn \$4,402.66.

But to state the amount in another form for the two last fiscal years, in reference to appropriation made of the tax of 1860, and collected in 1861 and 1862, it appears that the total receipts for the tax paid into the treasury, on account of this canal, have been \$168,552.07, and the payments during the two years have been \$113,486.79, leaving an apparent balance of \$55,065.28; but if this sum be expended there will be an overpayment of that amount, which added to the above overdraft of \$4,402.66, will make a total \$59,467.94. The work on the Glens Falls feeder is under contract, and is progressing, and its suspension would now cause serious inconvenience.

In making the appropriation for this canal, proper attention seems not to have been given to the condition of former appropriations, or the state of funds applicable to the improvement of the canal.

The following table, taken from the Auditor's financial report, will more fully show the present state of funds appropriated to the Champlain canal.

*Receipts and expenditures on account of the Champlain Canal, since  
30th September, 1858.*

RECEIPTS FROM	1859.	1860.	1861.	1862.	TOTAL.
Premiums on loans.....		\$2,496 15	\$1,076 82	\$999 23	\$4,572 20
Taxes of 1857.....	\$9,929 21				9,929 21
1859.....	4,470 21	55,020 08			59,490 29
1860.....			82,888 31		82,888 31
1861.....				85,663 76	85,663 76
Advance on tax of 1862.....				7,692 63	7,692 63
Loan for floating debt.....		44,963 99		640 00	45,603 99
Miscellaneous.....		1,863 25		179 50	2,042 75
	<u>\$14,399 42</u>	<u>\$104,343 47</u>	<u>\$83,965 13</u>	<u>\$95,175 12</u>	<u>\$297,883 14</u>
Appropriations overdrawn 30th Sept., 1862 .....					<u>\$4,402 66</u>
Appropriations overdrawn 30th Sept., 1858 .....					\$72,038 28
Expended by Canal Com- missioners.....	\$8,724 61	\$96,749 31	\$54,561 13	\$64,840 82	\$224,875 87
Auditor .....	2,773 29	180 79	63 33	2,354 14	5,371 55
	<u>\$11,497 90</u>	<u>\$96,930 10</u>	<u>\$54,624 46</u>	<u>\$67,194 96</u>	<u>\$302,285 80</u>

*Expenditures of Tax of 1860 and 1861.*

	1859.	1860.	1861.	1862.	TOTAL.
Am't realized from taxes..					\$168,552 07
Expended in 1861.....				\$54,624 46	
1862.....			\$67,194 96		
Less rec'd from tax of 1862 .....		\$7,692 63			
Floating Debt Fund .....		64,000 00	8,332 63	58,862 33	113,486 79
Balance unexpended 30th Sept., 1862.....					\$55,065 28
If this amount is expended add overdraft of 30th Sept., 1862.....					4,402 66
And the canal account will be overdrawn.....					<u>\$59,467 94</u>

**REMOVAL OF THE BENCHES FROM THE CANAL.**

I desire to call the attention of the Legislature to the remarks made upon this subject in the last annual report of the Canal Commissioners, and again to urge this work upon the serious consideration of the Legislature.

These benches permit serious and almost continual obstructions to the passage of the deeply laden larger class boats; while they remain as they were constructed no loaded boat drawing six feet of water can approach nearer either bank than nineteen feet. It has, in the crowded condition of the canals, become almost an indispensable necessity that these benches be removed from the short levels, and it would greatly expedite and facilitate navigation if entirely removed on the whole line. On the Eastern division of the Erie canal, which receives all the boats collected from all the canals destined to and from tide water, the capacity of the water-way, three feet from the top water-line, is one-fifth less than the recently completed portions of the same work; consequently when crowds of boats accumulate, and especially near

the close of navigation, when every craft afloat is pressing to reach tide water, this limited and confined capacity is seriously felt in dispersing them, and in forcing boats through in season to reach tide water.

Respectfully submitted.

W. I. SKINNER,

*Canal Commissioner.*

Dated ALBANY, December 10, 1862.



## MIDDLE DIVISION.

The Commissioner in charge of the Middle Division respectfully submits the following

### REPORT:

(He was elected at the annual election in 1861, for the unexpired term of the late Samuel H. Barnes. His immediate predecessor was the Hon. B. F. Bruce, chosen by the Legislature of 1861, and who served for the year ending December 31st, 1861, embracing three months of the last fiscal year.)

The Middle Division embraces the following canals, viz:

	Miles.
1. The Erie canal from Higginsville, Oneida county, to the county line between Seneca and Wayne counties, including Limestone, Butternut, and Nine Mile creek feeders, each navigable one mile.....	71.93
2. The Oneida Lake canal, including towing-path on Wood creek, six miles, the Oneida feeder, falling into the canal at Durhamville, and navigable one mile .....	7.
3. The Oswego canal.....	38.
4. Oneida river improvement .....	20.
5. Seneca river towing-path .....	5.75.
6. Seneca river improvement, at Baldwinsville, including three-quarters of a mile of canal slack water navigation, without any towing-path from Baldwinsville to Jack's reef.....	12.50
7. Cayuga and Seneca canal.....	22.77
8. Cayuga inlet.....	2.
9. Crooked Lake canal.....	8.
10. Chemung canal.....	23.
11. Chemung canal feeder.....	16.
12. Chenango canal .....	97.
Total.....	<u>323.95</u>

The Middle Division embraces also, the following reservoirs :

	Areas, acres.	Depth, feet.	Length of feeder, miles.	
Erieville.....	340	21½	20	
Hatch's lake.....	134	10	98	to Bradley Brook reservoir.
Eaton brook.....	254	50	8	
Bradley brook....	134	25	3	to Eaton Brook feeder.
Leland pond.....	173	8	½	
Woodman's lake..	148	11	¼	
Madison brook...	235	45	2	
Skaneateles .....	8,320	--	9	
Cazenovia lake...→	1,778	4½	10	
De Ruyter .....	626	--	--	

The Erieville reservoir and Cazenovia lake, through the Chittenango creek, are used as feeders of the "Long" or Rome level of the Erie canal, and have hitherto constituted the only considerable sources of supply, during the dry months, for the western portion of this level. To this will be added, when the DE RUYTER RESERVOIR is completed, and before the opening of navigation next spring, a quantity of water estimated at 500,000,000 cubic feet, precisely *when* and *where* it is most needed. In other words, it can be saved without material diminution till the lesser sources of supply have failed, and then be discharged within six miles of the Lodi locks. It contains six hundred and twenty-six acres of water surface, with an average depth of twenty feet, and the feeder from it to the Erie canal is twenty-five miles in length.

A contract for this reservoir (classified as an *enlargement* contract) was made March 29th, 1861. On the 1st of January, 1862, there still remained undone a considerable portion of the earth embankment of the dam, all of the cement masonry in the waste gates and in the bridge abutments and overfalls of the feeder, also the dam and bulkhead on the Tioughnioga river, at the head of the feeder, all of the bridge superstructures spanning the feeder, and much of the standing and fallen timber within the "flow lines."

It was neither practicable nor desirable to accomplish the larger portion of such work during the winter and spring months; hence the contractors made little progress, beyond the delivery and dressing of stone and timber, till the succeeding summer. The last Legislature made no adequate provision for paying

current monthly estimates on this class of contracts, but appropriated the sum of \$300,000 to pay final estimates. A law was also passed declaring all *enlargement* contracts "*completed*" on the first day of September, 1862.

The contractors for this reservoir insisted on proceeding with their work, waiving monthly payments, and at the above mentioned date demanded a settlement, embracing all the work done and materials delivered—which demand has been complied with.

Immediately after the adjournment of the Legislature, the contractors promised to employ and maintain such a force as would secure this structure against the danger of injury or destruction by floods, and to make it available for the purposes of its construction prior to the time limited for its completion by the law of 1862. They made great efforts and incurred heavy expenses to redeem their promise, but found themselves unable to do so, as they allege, owing to constant enlistments in the army and the unprecedented demand for labor.

This failure left the reservoir in such a condition, inasmuch as the embankment had not been carried up to the waste gates, that the entire dam might be swept away by the spring floods; and it was likewise incapable of receiving and retaining such a supply of water as the experience of the past season has demonstrated to be desirable and necessary on the western end of the long level. Besides, only certain sections of the feeder were completed, and, in the event of a moderate winter, the required contribution of the Tioughnioga river would be lost.

Under these circumstances, while the Commissioner in charge felt constrained, in obedience to the law, to close up all existing *enlargement* contracts, including the contract in question, he deemed it not less his duty to provide for the security and availability of this important work.

In pursuance of this purpose, on the 1st of October last, he entered into a new contract with Charles Nichols, of Syracuse, to perform the remaining work, so far as it may be necessary to afford safety to the dam and secure an adequate supply of water for the requirements of navigation hereafter. The estimated cost of the work to be done under the latter contract is \$32,800.

In the construction of this work, so far as it has progressed, no pains have been spared to procure the best materials and perform the work so as to give its banks and mechanical structures that substantial character which its great importance demands, and to provide against the possibility of future failure.

The undersigned has no doubt of the utility of this reservoir, nor that it will fully relieve a want which has seriously impaired navigation since the enlarged canal was brought into use—and more than ever during last season—namely, a larger supply of water at the western terminus of the long level. The drouth of the past summer was severe and protracted to a late period in the fall. To keep up the requisite depth of water on the western portion of the Rome level, it has been found necessary to use great care in feeding, and to provide against waste at every point. These precautions have been only partially successful in securing an uninterrupted movement of boats, loaded in almost every instance when moving east, to the limit allowed by the Canal Board. Extreme low water for some miles east of Lodi locks, it has been observed, has been certain to follow the prevalence of westerly winds for any considerable length of time, while the eastern portion of the level would accumulate more than was required for the purpose of navigation. It is confidently believed that the new source of supply contained in the De Ruyter reservoir, and to pass into the canal at a point farther west than the other large feeders, may in a great measure remedy this evil.

The Skaneateles lake is also used as a feeder of the Erie canal; the other reservoirs embraced in the preceding table are feeders of the Chenango canal.

#### ERIE CANAL.

##### REPAIR SECTION No. 7.

THOMAS GALE, *Contractor*. PHILIP P. MIDLER, *Superintendent*.

This section embraces twenty-seven miles of the Erie canal, extending from its junction with the Oneida Lake canal at Higgsville to the Limestone creek feeder; the Oneida creek feeder, two miles in length, navigable from Durhamville to Oneida, a distance of one mile; and the Erieville and Cazenovia lake reservoirs and Chittenango feeder. Total 29 miles.

This section was awarded to the present contractor for five years from the 1st of May, 1861; his annual compensation is \$3,490.

The structures are :

2 aqueducts,	23 culverts,
1 wooden lift-lock, (Oneida feeder,)	
3 wooden farm bridges,	5 iron road bridges,
15 wooden road bridges,	



- 1 guard gate, (Oneida feeder,)
- 3 waste weirs,
- 3 feeder dams,
- 2 guard gates.

The expenses of this section for the fiscal year ending Sept. 30th, 1862, chargeable to "repairs," are given as follows:

By the late Commissioner, under repair contract*	\$988 84
"    present    "    "    "    "	2,748 37
"    late    "    for necessary work not embraced in the repair contract.....	3,256 43
By the present Commissioner, for similar work...	2,763 43
"    late    "    miscellaneous.....	1,202 32
"    present    "    "    "    ".....	1,155 75
By Archibald Hess, late superintendent of repairs..	210 16
Total .....	<u>\$12,325 30</u>

#### REPAIR SECTION No. 8.

LEWIS SELYE, *Contractor.* PHILIP P. MIDLER, *Superintendent.*

This section extends from Limestone creek feeder to lock No. 50, above Geddes, including Limestone and Butternut feeders, each navigable one mile; total 13 miles. The contract price per year paid Mr. Selye was \$7,000. His contract expired Sept. 30th, 1862, (with the fiscal year.) The section has been relet for five years from Oct. 1st, 1862, to Charles Nichols for \$4,800 per annum.

The structures are :

- 3 double stone lift locks,
- 2 aqueducts,
- 4 culverts,
- 1 weigh-lock,
- 1 wooden farm bridge,
- 3 wooden feeder bridges,
- 1 wooden tow-path bridge,
- 9 wooden road bridges,
- 2 iron tow-path bridges,
- 7 iron road bridges,
- 1 iron foot bridge,

\* Drafts for *thirteen months'* payments to repair contractors were issued during the year, embracing estimates for September in each of the years '61 and '62; hence the excess in the item of expenditures for repairs under contract over the yearly amount of compensation specified in such contracts respectively.

- 1 feeder dam,
- 1 waste weir,
- 3 lock houses.

The following statement shows the expenditures on this section for repairs during the fiscal year :

By the late Commissioner, under repair contract..	\$3,033 32
"    present        "        "        "        "        "	4,462 47
"    late        "        for necessary work not embraced in the repair contract.....	629 00
By the present Commissioner for same class of work.....	765 00
By the late Commissioner, miscellaneous.....	1,340 64
"    present        "        "        "        "	1,155 74
"    superintendent of repairs.....	1,814 90
<b>Total.....</b>	<b>\$10,201 07</b>

#### REPAIR SECTION No. 9.

CHARLES J. HAYDEN, *Contractor*.

PHILIP P. MIDLER, *Sup't.*

This section extends from the foot of lock No. 50 to the east line of Wayne county, embracing the Skaneateles lake and feeder, and the Camillus feeder, navigable one mile; total 35 miles. A contract for keeping this section in repair was entered into with the present contractor on the 1st of May, 1861, and continues five years, with annual compensation of \$7,000.

The structures are :

- 3 double stone lift locks,
- 6 aqueducts,
- 2 waste weirs,
- 6 culverts,
- 1 wooden cchange bridge.
- 11 wooden road bridges,
- 6 wooden farm bridges,
- 11 iron road bridges,
- 1 iron foot bridge,
- 2 guard gates,
- 4 feeder dams,
- 3 receivers.

The amount expended on this section during the year, chargeable to repairs, is as follows :

## CANAL COMMISSIONERS.

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By the late Commissioner, under repair contract..	\$1,983 32
“ present “ “ “ “ ---	5,512 51
“ late “ for necessary work not embraced in the repair contract.....	3,119 50
By the present Commissioner, for similar work....	391 00
• “ late “ miscellaneous .....	1,289 02
“ present “ .....	1,155 75
“ superintendent of repairs .....	801 23
	<hr/> \$14,252 33 <hr/>

## OSWEGO CANAL.

## REPAIR SECTION No. 1.

WILLIAM AVERY, *Contractor.* ELLIOT HARROUN, *Superintendent.*

This section extends from Syracuse to Three River Point, and includes the Seneca river towing path and Baldwinsville canal. Total, 21½ miles.

Up to the 30th of April last, the contract for repairs was held by Henry D. Denison, at an annual compensation of \$2,800. The section was relet May 1st, 1862, to the present contractor, for four years and eight months, for \$9,000 per annum.

The structures are :

- 4 stone lift locks,
- 1 composite lift lock,
- 1 wooden lift lock,
- 1 wooden guard lock,
- 4 composite culverts,
- 5 iron road bridges,
- 1 iron change bridge,
- 11 wooden road bridges,
- 4 wooden change bridges,
- 2 floating tow-path bridges,
- 1 wooden river dam,
- 3 waste weirs,
- 4 lock houses,
- 1 State Shop.

The expenditures for the fiscal year, chargeable to “repairs,” are as follows:

By the late Commissioner, under repair contract..	\$793 32
By the present do do do ..	4,400 86

By the late Commissioner, for necessary work not embraced in the repair contract.....	\$594 99
By the present Commissioner, for similar work*..	28,815 00
By the late Commissioner, miscellaneous.....	559 26
By the present do do .....	1,886 38
By the superintendent of repairs.....	1,876 12
	<hr/>
	\$38,925 92
	<hr/>

"Mud lock," a minute description of the failure of which was made in the report of last year, has been entirely rebuilt, in a manner which compares favorably with any structure of the kind on any of the enlarged canals. The materials for this lock, the most of which were necessarily delivered before the close of navigation in 1861, were procured by an arrangement with the late Commissioner. Early in the winter, a formal contract for its construction was concluded by the Board of Commissioners with Henry D. Denison. The work, superintended by Thos. Gale, was conducted with such industry and vigor that, during the suspension of navigation, the old structure was removed, a permanent pile foundation was made, and the new structure completed in time to pass boats on the first day of the opening. The total cost of this work will be about \$39,000, of which \$28,815 was paid in the last fiscal year.

A short distance above this lock, there has also been built a stone waste weir, the necessity for which, to regulate the Liverpool level, was suggested in the last report. The cost is about \$2,800, being the amount authorized by the Canal Board.

The dam at Baldwinsville has been put in repair during the last summer. It is now believed to be comparatively in a good and safe condition; nevertheless, like all old wooden dams, it is constantly settling or wearing away. The additional cost for the work done on this dam during the last summer is about \$2,000.

## SECTION No. 2.

CHARLES E. CASE, *Contractor*. ELLIOT HARROUN, *Superintendent*.

This section extends from Three River Point to Oswego, including the Oneida river improvement (43 miles). For the three years preceding the 1st of February, 1862, a repair contract existed with Stinson Ostrander, at an annual compensation

\* For "taking up, piling and rebuilding 'Mud lock.'"

of \$12,899. The section was relet, commencing May 1st, 1862, to the present contractor, at \$11,900 per annum. This contract expires December 31st, 1866.

The structures are :

- 13 stone lift locks,
- 5 stone guard locks,
- 2 steamboat lift stone locks, 120x30,
- 5 wooden waste weirs,
- 7 wooden road bridges,
- 2 wooden road and change bridges,
- 6 wooden change bridges,
- 1 wooden river tow-path and change bridge,
- 2 iron road bridges,
- 2 stone river dams,
- 7 wooden river dams,
- 1 aqueduct,
- 1 bulkhead,
- 1 draw bridge,
- 4 composite culverts,
- 20 lock houses,
- 1 State shop.

The expenditures on this section for the fiscal year for repairs have been as follows :

By the late Commissioner, under repair contract..	\$3,654 72
By the present do do do ..	7,063 08
By the late Commissioner, miscellaneous.....	1,118 52
By the present do do .....	1,327 11
By the superintendent of repairs.....	9,535 22
	<hr/>
	\$22,698 65
	<hr/>

The berm vertical wall above lock No. 17, at Oswego, 22 feet high, has a waste over the top 103 feet in length. Owing to the great fall of water, and accumulation of ice during winter, it had from year to year been damaged on its outer or river surface, and undermined at its foundation. On the thawing of the overhanging ice last spring, this wall was found to have been injured to such an extent as to require thorough repair during the low water of summer. At the opening last spring, there being then no repair contract in force on this section, the superintendent commenced preparations for this repair. The work has been

continued by the repair contractor, but it will not be finished until next season. The estimated cost of this work is \$6,600, and about \$3,000 have been already expended on it.

An extra expenditure of \$335.58 has been made for a waste weir, on the short level between locks Nos. 9 and 10, at Fulton. The tow-path, for a short distance below lock No. 11, never before built to the requisite height, has been raised at an extra cost of \$476.42.

An extra crib has also been built on a branch of the river at Horse Shoe dam, to more effectually secure the latter structure against high water. This work is incomplete, but is estimated to cost \$1,200.

An extra crib has also been put in below the apron, at the west end of the high dam, to prevent the abutment from becoming undermined; and some rip-rap wall on the other end, to secure the lock embankments, at a cost of \$323.28.

The wooden Whipple bridge superstructures—one at Phoenix, and the other at Oswego—have failed and fallen down. They have been replaced with iron cord bridges, at an extra cost not yet ascertained. Another of these bridge superstructures at Van Buren's, near Fulton, has also failed, but has been rebuilt on the old plan.

This plan of a bridge has not proved durable nor really economical, though the first cost is low, and no more of them should be built. It has been found impracticable to exclude the water from the joints, especially at the lower chords, and many of them have become so decayed in three or four years as to be unsafe. Of the various plans in use, in the original construction of the canals, and in the earlier days of the enlargement, there were none which did not remain sound and secure for seven years or more—many of them lasting for twenty years. When iron bridges are not adopted, it is respectfully recommended that the "Beardslee iron chord"—which is indestructible at the point where all wooden bridges finally fail—be substituted.

#### UNFINISHED WORK FOR THE ENLARGEMENT OF THE OSWEGO CANAL.

Some of the work embraced in the late enlargement contracts is still incomplete. There are about one thousand yards on "sections 24, 25, 26, and part of 27," of cemented clay and gravel and boulders, being dredging on the river level above Fulton. This should be removed before the opening of naviga-

tion next spring, as some trouble has occurred on this account during the past season.

The next contract above, ("parts of sections 22 and 23") a canal level a mile long, was very far from being completed on the 1st day of September. The delay was due both to the extraordinary hardness of the excavation, and the difficulty of getting an adequate force of men. The contractor (Thomas Gale, assignee,) is pushing on the work to completion, without, however, any directions or recognition from the Commissioner in charge, who has uniformly refused to order any enlargement work left incomplete at the above mentioned date.

By a concurrent resolution of the Senate and Assembly last winter, the Canal Board was requested to so regulate the Phoenix dam as to maintain *seven* feet of water in the river above, and no more.

Nothing has yet been done in the premises. It is suggested that it may soon become necessary to rebuild all of the remaining wooden dams on the Oswego river, as they have now stood for more than thirty-five years. They are annually reduced from half an inch to an inch, through the abrasion or decay of the timber. As they are all indispensable to the maintenance of navigation on this important canal, true economy would probably be best consulted in rebuilding them of stone at the earliest period that the financial condition of the State will warrant the expenditure. The dam at Phoenix is among the poorest on the river; and it is respectfully suggested whether, in regulating it, a stone structure should not be adopted, as cutting away the old dams may seriously impair its strength.

#### WEIGH LOCK AT OSWEGO.

The recommendation of the late Commissioner for the construction of a weigh lock at Oswego, is respectfully endorsed. The experience of the past year has afforded much additional evidence of the necessity of this structure. Its utility would by no means be confined to the Oswego canal, for it would relieve the pressure at the Syracuse weigh lock, and greatly facilitate the passage of boats at that difficult point. But half the time is consumed in passing boats through the lift lock which is necessarily occupied in getting them through the weigh lock. This fact has, during the past season, frequently created much confusion and detention at Syracuse; and especially has this difficulty been increased when the Rochester weigh lock was out of repair,

or unable to weigh on account of high water—occurrences which frequently happen.

The estimated cost of this improvement—so locating the lock as to make it one of a tier of double locks—is as follows :

Cost of lock proper.....	\$26,000 00
do the building.....	8,500 00
do scales.....	4,500 00
Total .....	<u>\$39,000 00</u>

### CAYUGA AND SENECA CANAL.

GEORGE M. CASE, *Contractor*. PHILIP P. MIDLER, *Superintendent*.

This canal extends from the Erie, at Montezuma, to Seneca lake, at Geneva, with a branch from lock No. 9 to East Cayuga, at the foot of Cayuga lake. Total miles in length, 23.

A contract for the repairs of this canal was entered into with John Ecker, June 1, 1861, to extend four years from that date; price per annum, \$4,490. In consequence of the refusal or neglect of the contractor to perform the work required of him by the terms of his contract, (as certified by the resident engineer and the superintendent of repairs in charge) his contract was declared abandoned, April 7, 1862. The repairs were relet under contract commencing July 1, 1862, to the present contractor, at an annual compensation of \$9,950, and for a period of four years and six months.

The structures are :

- 11 composite lift locks,
- 1 side lock at Seneca Falls,
- 9 culverts,
- 1 pier at foot of Cayuga lake,
- 1 pier at foot of Seneca lake,
- 7 iron bridges,
- 15 wood bridges,
- 5 dams.

The expenditures on this canal for repairs, during the fiscal year, have been as follows :

By the late Commissioner, under the repair contract.	\$1,272 16
present do do do	2,750 45
late Commissioner, for necessary work not embraced in the repair contract.....	940 88
superintendent of repairs.....	15,606 86



By the late Commissioner, miscellaneous .....	\$310 95
present do do .....	1,886 26
	<hr/>
	<u>\$22,767 56</u>

The locks on which this heavy expenditure by the superintendent was necessarily incurred, are built on the "composite" plan. Nearly all the work paid for in the item of \$15,606.89, as before stated, was embraced in the repair contract of John Ecker, under a special notice attached to and forming part of his contract. Though not excepted in terms, portions of the repairs on the lower lock, at Seneca Falls, (lock No. 7,) were not fairly included in the work which he had undertaken to perform, for this lock was originally constructed too narrow to pass boats of the enlarged size, when loaded down to "regulation" depth.

The river level coming up to this lock, involved an extra expense of coffer dams, and at the time of the alterations and repairs was unusually high—requiring the constant employment of three engines to pump out the pit, in order to do the work of taking up, relaying and chiseling down masonry behind the wood work.

On the 7th day of April last, this contract was declared abandoned by the Contracting Board, leaving in the treasury \$4,000 deposited by the contractor as security by the terms of the letting; also \$505.08 of per centage retained, and \$374.16, being the amount of the monthly rate for March. These sums being deducted from the aggregate expenditure, leaves \$10,727.62 paid by the State, mostly for repairing and partially rebuilding these locks preparatory to the opening of navigation.

These repairs were mainly on locks Nos. 1, 5, 6 and 7, which proved on examination to be so far decayed in the wood work of the chambers and portions of the gates, that they were utterly unfit for further use. The stone walls in rear of the wood work were laid up, or rather *thrown in* dry, without enough of form and solidity in some cases to hold the horizontal anchors to secure the upright posts of wood. Thus when the locks were emptied, the water, with a head corresponding with the lift thereof, passed through a pile of loose stone, and was constantly detaching the plank lining from the posts, as in the case of the breach in lock No. 6 after the opening of navigation. The walls of the chambers

pressed in to such an extent that it was necessary to take up and relay them in concrete.

All of these locks had to be bailed out at a heavy outlay for steam pumps, hence the work in question proved much more difficult and expensive than had been anticipated by the Commissioner in charge or the division engineer, who assisted the superintendent, and gave to the matter much of their personal attention.

It seems one of the most unaccountable and unfortunate errors which has occurred in the progress of the enlargement, that such an objectionable and expensive plan should have been adopted as this of "composite locks," instead of indestructible stone locks, and at a point within one to three miles (by water as well as land carriage) of the cheapest and best blue limestone quarries in the State.

The sum of \$1,405 was expended in repairs to the towing path, which had been much damaged by high water in the spring of 1861.

The work of dredging out bars in the canal and lake harbor at Geneva was performed at a cost of \$853.

#### CHEMUNG CANAL AND FEEDER.

JAMES BELLOWES, *Contractor*, by JARVIS LORD, *Assignee*.

OLIVER ALLEN, *Superintendent*.

This canal extends from the head of Seneca lake, at Watkins, to Elmira, including the feeder from Horseheads to Knoxville, making a total distance of 39 miles of navigable canal. Under the contract of T. W. Amesbury, (which expired January 31st, 1862,) his compensation for repairs was \$13,475 per annum. The canal was relet, and a contract entered into with James Bellows, commencing April 1st, 1862, and which expires December 31st, 1866. Price per annum, \$15,960.

The structures are :

- 2 composite locks,
- 13 timber locks,
- 1 timber guard lock,
- 38 old timber locks,
- 4 aqueducts,
- 13 waste weirs,
- 2 culverts,
- 1 dam and bulkhead,

- 3 road bridges, iron,
- 35 road bridges, wood,
- 14 farm bridges,
- 1 towing path bridge, wood.
- 1 towing path bridge across Chemung river.

The expenditures on this canal for the fiscal year have been as follows :

By the late Commissioner, under repair contract....	\$3,817 92
do present do do do .....	9,758 73
do late Commissioner, for necessary work, not embraced in the repair contract.....	14,190 00
do present Commissioner, for similar work....	62,089 69
do superintendent of repairs.....	9,744 72
do late Commissioner, miscellaneous.....	5,239 69
do present do do .....	2,699 90
Total.....	<u>\$104,840 65</u>

#### REBUILDING OF LOCKS.

During the year 1861, a contract was entered into by Commissioners Bruce and Gardner with C. C. Barker, (then in charge of the repairs of this canal,) to rebuild ten of the wooden locks before the opening of navigation in the spring of 1862. A plan was adopted so entirely different from the former plan, that only portions of the old foundations were available for the new structures. The work of removing the old locks and procuring materials for the new ones had progressed so far when the present Commissioner was placed in charge, that there was no opportunity to make any changes, if any should be deemed expedient, with a view to reduce the expenditure about to be made. It was ascertained, however, that there was no decayed timber below the water lines, and the foundations were good except of the feeder lock.

It will probably not be wise nor necessary, in reconstructing other locks on this canal, to incur any expense in the foundations or below the water lines, except where it may be found that the walls are so far pressed inward as not to give the necessary width of chamber. It is believed, however, that not more than one or two of the locks which it is proposed to rebuild during the coming winter are in this condition, and possibly none of them.

## CHENANGO CANAL.

This canal extends from the Erie canal to the Susquehanna river at Binghamtom—9 $\frac{7}{8}$  miles. It comprises three repair sections, as follows :

## SECTION No. 1.

ALONZO PECK & Co., *Contractors.*

CHARLES H. SMITH, *Sup't.*

Contract expires five years from May 1, 1861. Contract price per annum, \$13,990.

Section extends from the junction of the Chenango and Erie canals, in the city of Utica, to the foot of lock No. 81, one mile south of the village of Hamilton, 31 miles. The following reservoirs are located upon this section : Madison brook, Woodman's pond, Leland's pond, Bradley's brook, Hatch's lake, and Eaton's brook, all of which are in the southern part of Madison county. Connected with the section are 13 $\frac{3}{4}$  miles of feeders. Total miles, canal and feeders, 44 $\frac{3}{4}$  miles.

The structures are :

- 77 composite lift locks,
- 4 stone lift locks,
- 4 wooden trunk aqueducts,
- 1 stone arch culvert,
- 1 guard lock.
- 12 arch culverts,
- 7 box culverts,
- 9 waste weirs,
- 3 iron bridges,
- 44 wood bridges,
- 30 bridges on feeders.

The expenditures upon this section for the last fiscal year have been as follows :

By the late Commissioner, under repair contract..	\$3,963 80
“ present Commissioner, under repair contract	11,017 11
“ late Commissioner, for necessary work not embraced in the repair contract.....	1,238 80
By the late Commissioner, miscellaneous.....	24 31
“ present Commissioner, miscellaneous.....	62 00
“ By the superintendent, including his salary	636 32
	<hr/>
	\$16,942 34
	<hr/>

## SECTION No. 2.

JOHN P. SMITH, *Contractor.* P. H. TERHUNE, *Superintendent.*

Contract expires five years from October 1st, 1860. Contract price per annum, \$5,600.

The section extends from the foot of lock No. 81 to and including the first farm bridge above lock No. 100 : distance, 34 miles.

The structures are :

- 18 composite lift locks,
- 8 wooden trunk aqueducts,
- 6 waste weirs,
- 9 bridges on feeders,
- 3 iron bridges,
- 60 wooden bridges,
- 13 arch culverts.

There are six feeders with an aggregate length of four miles, with dams to the length of 1,000 feet.

The expenditures on this section for the fiscal year have been as follows :

By the late Commissioner, under repair contract..	\$2,426 64
“ present Commissioner, under repair contract	3,569 94
“ late Commissioner, for necessary work not embraced in the repair contract.....	2,482 00
By the present Commissioner, for similar work....	10,685 37
“ present Commissioner, miscellaneous.....	50 00
“ superintendent, including his salary.....	320 92
	<hr/>
	\$19,534 87
	<hr/>

## SECTION No. 3.

JOSIAH BRINTNALL, *Contractor*, by SNOOK & BEEBE, *Assignees.*

P. H. TERHUNE, *Superintendent.*

The contract expires five years from May 1, 1861. Contract price per annum, \$7,000.

The section extends from the first bridge north of lock No. 100 to the junction of the canal with the Chenango and Susquehanna rivers, in the village of Binghamton : distance, 32 miles. The Stratton and Chenango forks feeders are located on this section, the Stratton being about fifty rods in length, with a dam three hundred and fifty feet in length, and having two bridges, one farm, the other towing path. The Chenango forks feeder con-

sists of a dam three hundred and fifty feet in length, with a guard lock, having a towing path bridge across it.

The structures are :

- 1 stone lift lock,
- 14 composite lift locks,
- 1 guard lock,
- 2 dams,
- 7 waste weirs,
- 5 wooden trunk aqueducts,
- 3 iron bridges,
- 55 wooden bridges,
- 10 arch culverts,
- 1 bridge on feeder.

The supply of water for this canal is from the reservoirs and Chenango river.

The expenditures on this section for the fiscal year have been as follows :

By the late Commissioner, under repair contract..	\$2,333 32
“ present Commissioner, under repair contract	5,512 51
“ present Commissioner, miscellaneous.....	71 02
“ superintendent, including his salary.....	320 91
	<hr/>
	\$8,237 76
	<hr/>

During the past winter, lock No. 89 on this canal was rebuilt on the old foundations. The chamber walls are composed of sound and durable stone, of large area of bed, laid in cement mortar, but without any dressing. To avoid the contact of boats with the rough surface of these walls, fenders of oak timber are anchored into the walls at intervals of about four feet. The wing walls and recess stone are of dressed masonry. Thus there are no destructible materials in this lock, except in the fenders, gates, and wooden hollow quoins ; and it was rebuilt at an expense of only \$5,043.94.

It is believed that a still further improvement and reduction in cost of this plan would be found, in dispensing with all dressed masonry and curved wings. Locks constructed in this manner and of such materials will cost much less than the old style of “composite” locks, and be quite as good for all practical purposes as locks of dressed stone.

## CROOKED LAKE CANAL,

HOMER W. RANDALL, *Contractor*, by FARLEY HOLMES, *Assignee*.

OLIVER ALLEN, *Superintendent*.

This canal extends from Crooked lake, near Penn Yan, to Seneca lake, at Dresden—distance 8 miles. Contract price per annum \$3,869; expires five years from October 1, 1860.

The structures on this canal are:

- 27 lift locks,
- 1 guard lock,
- 6 waste weirs,
- 2 culverts,
- 14 bridges,
- 4 dams

The expenditures for repairs during the fiscal year have been as follows:

By the late Commissioner, under repair contract....	\$1,402 50
By the present Commissioner, under repair contract..	2,466 44
By the present Commissioner for necessary work not embraced in the contract.....	823 44
By the superintendent of repairs.....	2,395 61
	<hr/>
	\$7,087 99

## ONEIDA LAKE CANAL.

WILLIAM R. CHAPMAN, *Contractor*. ELLIOT HARROUN, *Sup't.*

This canal connects the Erie canal with the waters of Oneida lake, furnishing thirty miles of lake navigation, intersecting the Oneida river improvement, which forms a junction with the Oswego canal at Three-river Point. The Oneida Lake canal, proper, is six miles in length, and extends from the Erie at Higginsville, to the head of Oneida lake.

Contract price per annum, \$2,375. Contract expires September 30, 1865.

The structures are:

- 7 wooden lift locks,
- 2 culverts,
- 1 towing-path bridge,
- 2 road bridges,
- 3 lock houses,
- 4 watch houses,
- 1 collector's office.

The expenditures for the fiscal year have been as follows :

By the late Commissioner, under repair contract.....	\$1,029 17
By the present Commissioner, under repair contract..	1,514 07
By the superintendent of repair.....	100 00
	<hr/>
	\$2,643 24
	<hr/>

The Legislature, during the last session, passed a law directing the Commissioners "to cause accurate estimates to be made of the cost of rebuilding the locks of the present dimensions, and also of the cost of constructing the enlarged locks."

These estimates were made for the purpose of ascertaining the relative amounts which should be contributed by the Repair and the General Fund to defray the expense of constructing the enlarged locks. The law, also, provides that "said locks are not to be rebuilt so long as ordinary repairs, above high water mark in the canal, will keep them in good navigable condition."

The act of 1860 (chap. 46), which is amended but not repealed by the law of '62, makes it "the duty of the Canal Commissioners to have such locks constructed of timber of the same dimensions as the enlarged locks on the Erie canal," whenever it shall become necessary to rebuild any of them."

Acting under these laws, it seemed to the undersigned that the only discretionary power possessed by the Canal Commissioners was to determine whether the time had arrived when these locks could no longer "be kept in good navigable condition with ordinary repairs." The Commissioners examined the work in person, and a majority of the Board being of opinion that all of these locks were not only "*not* in good navigable condition, but could not be put in such condition without reconstruction, directed them to be advertised for letting.

*Recapitulation of Expenditures.*

Erie canal.....	Section No. 7,	\$12,325 30
do .....	8,	10,201 07
do .....	9,	14,252 33
Oswego canal.....	1,	38,925 92
do .....	2,	22,698 65
Cayuga and Seneca canal .....		22,767 56
Chemung canal and feeder.....		104,840 65



**CANAL COMMISSIONERS.**

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Chenango canal.....	Section No. 1,	\$16,942 34
do .....	2,	19,534 87
do .....	3,	8,237 76
Crooked Lake canal.....		7,087 99
Oneida Lake canal.....		2,643 24
<b>Total .....</b>		<b>\$280,457 68</b>

The aggregate amount paid from the Repair Fund  
in the last fiscal year, by the present and the late  
Commissioner, as above exhibited, is..... **\$280,457 68**

Which is made up of the following items:

*For ordinary repairs under contract.....	\$86,475 57
By present Commissioner on contracts made prior to January 1, 1862, and for work ordered by former Commis- sioners .....	106,315 50
By the late Commissioner for necessary repairs not embraced in contracts, and miscellaneous expenditures....	37,536 31
Miscellaneous payments by present Com- missioner of obligations incurred by the Contracting Board of 1861.....	2,951 54
By the present Commissioner, for work outside of repair contracts, miscel- laneous, &c., for nine months of the last fiscal year .....	47,178 76
	<b>\$280,457 68</b>

**DRAFTS AND CERTIFICATES FOR LAND DAMAGES.**

Drafts and certificates for land damages, on awards made by  
the Canal Appraisers, have been issued during the fiscal year in  
aggregate amounts as follows:

By B. F. Bruce, late Commissioner, during the three months  
ending December 31, 1861:

On account of what canal.....	Amount.
Erie enlargement.....	\$4,654 00
Oswego enlargement.....	910 00
Cayuga and Seneca enlargement.....	640 00
<b>Total .....</b>	<b>\$6,204 00</b>

\*Includes one monthly payment for the fiscal year 1861.

Issued by the present Commissioner from January 1st to  
September 30, 1862 :

On account of what canal.	Amount.
Erie enlargement .....	\$21,236 78
Oswego enlargement.....	765 06
Total .....	<u>\$22,001 84</u>
By the late Commissioner.....	\$6,204 00
By the present Commissioner.....	22,001 84
Total .....	<u><u>\$28,205 84</u></u>

## REPAIRS OF THE CANALS.

*The following table shows the names of the repair contractors on the Middle Division, their location and compensation, and the date and continuance of their contracts.*

Canal.	Contractor.	No. of section.	Date of contract.	Contract expires.	Compensation per annum.
Erie	Thomas Gale	7	May 1, 1861.	April 30, 1866.	\$3,490 00
do	Lewis Seelye	8	Oct. 1, 1859.	Sept. 30, 1862.	7,000 00
do	Charles J. Hayden	9	May 1, 1861.	April 30, 1866.	7,000 00
Oswego	William Avery	1	May 1, 1862.	Dec. 31, 1866.	9,000 00
do	Charles E. Case	2	May 1, 1862.	Dec. 31, 1866.	11,900 00
Cayuga and Seneca	George M. Case	All.	July 1, 1862.	Dec. 31, 1866.	9,950 00
Chemung and feeder.	James Bellows	All.	April 1, 1862.	Dec. 31, 1866.	15,960 00
Cheungo	A. Peck & Co.	1	May 1, 1862.	April 30, 1866.	13,990 00
do	John P. Smith	2	Oct. 1, 1860.	Sept. 30, 1865.	5,600 00
do	Josiah Brintnall	3	May 1, 1861.	April 30, 1866.	7,000 00
Oneida lake	Wm. R. Chapman	All.	Oct. 1, 1860.	Sept. 30, 1865.	2,375 00
Crooked lake	Homer W. Randall	All.	Oct. 1, 1860.	Sept. 30, 1865.	3,869 00
Total per annum					\$97,134 00

*Tabular statement showing the estimated cost, amount of work done in fiscal year ending September 30th, 1862, whole amount done, and amount remaining to be done, for repair construction on Middle Division of the New York State Canals.*

Character of work.	Estimated cost.	Am't done in 1862.	Whole am't done.	Am't rem. to be done.
<b>ERIE CANAL.</b>				
Repair superintendent, section No. 8 ..	\$27,613 96	\$5,235 42	\$26,415 49	Settled.
Repair superintendent, section No. 9 ..	6,400 00	4,200 00	4,940 00	\$1,460 00
Culvert at Canastota .....	2,700 00	680 00	680 00	.....
Bridge at Manlius .....	890 15	890 15	890 15	Settled.
Total .....	\$37,604 11	\$11,005 64	\$32,925 64	\$1,460 00
<b>OSWEGO CANAL.</b>				
Waste weir between locks 9 and 10 .....	\$335 58	\$335 58	\$335 58	.....
Raising tow-path below lock 11 .....	476 42	476 42	476 42	.....
Removing cemented, sand and gravel and rock, above new bridge .....	750 00	750 00	750 00	.....
Repairing broken wall at Oswego .....	6,600 00	2,400 00	2,400 00	\$4,200 00
New crib at High dam .....	323 28	323 28	323 28	.....
New crib at Horse Shoe dam .....	1,200 00	200 00	200 00	1,000 00
Repairing dam at Baldwinsville .....	2,000 00	2,000 00	2,000 00	.....
Apron to Brandy brook culvert .....	950 00	600 00	600 00	350 00
Rebuilding Mud lock .....	41,000 00	41,000 00	41,000 00	.....
Dredging channel for boatway around Mud lock .....	707 00	707 00	707 00	.....
Waste weir on Liverpool level .....	2,800 00	2,800 00	2,800 00	.....
Total .....	\$57,142 28	\$51,592 28	\$51,592 28	\$5,550 00
<b>CHEMUNGO CANAL.</b>				
Repairs, lock No. 9 .....	\$5,043 94	\$5,043 94	\$5,043 94	Settled.
do Sherburne aqueduct .....	12,342 50	6,343 82	17,183 82	Completed
do road bridge at Norwich .....	1,032 43	1,032 43	1,032 43	Settled.
Total .....	\$18,418 87	\$12,420 19	\$23,260 19	.....
<b>CAYUGA AND SENECA CANALS.</b>				
Excavating outlet of Seneca lake (under act chap. 479, Laws 1857) .....	\$5,500 00	\$860 00	\$860 00	\$4,640 00
Bridge at Evan st., village of Geneva ..	800 00	.....	.....	800 00
Total .....	\$6,300 00	\$860 00	\$860 00	\$5,440 00
<b>CHEMUNG CANAL.</b>				
Repairs, locks Nos. 19, 27, 31 .....	\$20,883 70	.....	\$20,042 87	Settled.
Repairs, locks Nos. 12, 14, 34, 38, 39, 42, 44, 50, 51, 52 .....	88,960 00	\$88,694 46	89,214 46	Completed
Repairs, locks Nos. 35, 37, 41 .....	18,022 30	.....	16,485 32	Settled.
Bridge over Catherine creek .....	1,365 00	1,020 00	1,020 00	\$345 00
Repairs of dock at Corning, guard pier at Gibson, and berm docking at head of guard lock at Gibsons .....	3,921 82	3,921 82	3,921 82	Settled.
Total .....	.....	.....	.....	.....

PAYMENTS ON ACCOUNT OF THE ENLARGEMENT OF THE ERIE, THE  
OSWEGO, AND THE CAYUGA AND SENECA CANALS.

The following table shows the aggregate payments during the fiscal year, on account of the enlargement of the Erie, the Oswego, and the Cayuga and Seneca canals.

*Enlargement of the Erie.*

By the late Commissioner, for sec. work	\$1,000	00	
do De Ruyter reservoirs.	14,603	00	
do Engineering expenses.	2,452	62	
do Land damages.....	4,654	00	
			\$22,709 62
By the present Commiss'er, for sec. work	\$23,788	76	
do De Ruyter reservoir..	13,583	00	
do Engineering expenses.	6,948	34	
do Land damages.....	21,236	78	
do Miscellaneous .....	1,000	28	
			66,557 16
Total.....			<u>\$89,266 78</u>

*Enlargement of the Oswego.*

By the late Commissioner, for sec. work	\$4,172	38	
do Engineering expenses.	1,604	42	
do Land damages.....	910	00	
			\$6,686 80
By the present Commiss'er, for sec. work	\$28,889	64	
do Engineering expenses.	5,989	76	
do Land damages.....	765	06	
do Miscellaneous .....	578	90	
			36,223 36
Total.....			<u>\$42,910 16</u>

*Enlargement of the Cayuga and Seneca.*

By the late Commissioner, for sec. work	\$5,525	00	
do Engineering expenses.	150	47	
do Land damages.....	640	00	
			\$6,315 47
By the present Comis'er, for sec. work.	\$18,404	66	
do Engineering expenses.	4,569	16	
do Miscellaneous .....	326	44	
			23,300 26
Total.....			<u>\$29,615 73</u>

Statement showing the amount paid by draft on the Auditor for engineering expenses on the Middle Division of the canals, during the fiscal year ending September 30th, 1862:

By the late Commissioner:

For enlargement of the Erie canal....	\$2,452 67	
do do Oswego canal	1,604 42	
do do Cayuga and Seneca canal.....	150 47	
		\$4,207 56
Repairs of the Chenango.....	\$359 64	
Repairs of the Chemung and feeder ..	961 02	
Repairs of the Crooked Lake canal....	200 00	
		1,520 66
Total by late Commissioner.....		<u>\$5,728 22</u>

By the present Commissioner:

For enlargement of the Erie canal....	\$6,948 34	
do do Oswego canal	5,989 76	
do do Cayuga and Seneca canal.....	4,569 16	
		\$17,507 26
Repairs of the Chenango.....	\$2,460 02	
do Chemung and feeder ..	1,295 27	
		3,755 29
		<u>\$21,262 55</u>
By the late Commissioner.....	\$5,728 22	
do present do .....	21,262 55	
		<u>\$26,990 77</u>

#### REMOVING OBSTRUCTIONS FROM THE SENECA RIVER, AND DRAINING CAYUGA MARSHES.

By chapter 465 of the Laws of 1862, the law of 1858 was amended by appropriating the sum of \$25,000 to remove obstructions at the outlet of Cayuga lake and in the channel of Seneca river, but coupled with the condition that no part of this sum should be expended "except on a contract that will insure the entire completion of said work within said additional appropriation."

The Commissioner in charge of the Middle Division, under whose supervision this work came, considered it necessary to a

proper understanding of his duties under these provisions, to make a personal examination of the obstruction to the natural flow of the waters of the Seneca river by the enlarged canal, and has continued this examination down the river to Cross lake, and has caused a survey to be made and levels of the river taken, under the directions of M. S. Kimball, engineer, all the way from Cayuga lake to Baldwinsville. A map and profile of the river, giving the result of these examinations, have also been completed. In addition to the surveys thus made, the undersigned has consulted the necessary maps and documents to form an opinion in regard to the whole subject of removing the obstructions caused by the State, and of draining the marsh lands along the river. He feels it due to the subject that a condensed statement of the whole matter should be made to the Legislature, that any future action may be based on a proper knowledge of what is necessary to protect the State from claims to damages for overflowing lands, and to enable it to assess a proper portion of the expenses heretofore incurred in removing bars and obstructions from the river at Jack's reef and other places.

The enlarged canal crosses the Cayuga marshes at Montezuma on an embankment that averages about twelve feet high, and is 15,000 feet long. A description of the locality published in the Canal Commissioner's Report in 1858 (pp. 113 and 114), is as follows:

"The river, where it is crossed by the canal, is divided by Kipp's Island into two channels. Into the west channel empties the Canandaigua river; this channel has been filled up, and to provide for the water that formerly flowed through it, a cut of about one hundred and fifty feet wide has been made across the island above the canal, and all the water thereby carried to the east channel. The west channel by Kipp's Island is commonly called the 'Canandaigua river' down to its junction with the other channel. The east channel is usually known as the 'Seneca river.' The west or Canandaigua channel was deep for its whole length, averaging at low water about sixteen feet. The east or Seneca channel is shallow, averaging in low water less than four feet in depth. The effect of carrying all this water into the east channel (in such times as the marshes are not covered with water so as to allow a free flow over the canal) is to dam it up. So that on the 7th day of November, 1857, there were two feet difference in the level of the surface of the river, above and below the enlarged

canal where it crosses the Canandaigua channel. This difference had gradually increased from nine inches on the 7th day of September. By the 14th day of November the freshet was at its greatest height, the water flowing freely over the old canal from the lock near the Canandaigua channel westward, all the way across the marshes, for a depth over the tow path of more than two feet, thus giving a cross section of at least 15,000 feet." \*

It is further stated in this connection, that at this time "the water stood two feet and sixteen-hundredths above the under side of the trunk of the aqueduct, (at Montezuma,) with a free passage of 15,000 feet over the marshes."

The completion of the embankment for the canal closed this 15,000 feet of water way, and forced all the water into the east channel and under the aqueduct, and greatly lessened, for all time to come, the space through which the waters of the river must flow. It is manifest that the construction of the enlarged canal across these marshes has materially obstructed the natural flow of the water. In the report before referred to, (page 113,) it is stated that the whole marsh descends from Cayuga lake northward, to and beyond the "direct" railroad bridge, at the rate of five inches to the mile. Though these marshes are covered thickly with flags and other aquatic plants, yet a declivity in the direction of the flow of the water of five inches to the mile must have allowed a vast quantity to pass, when it was from two to three feet deep for the whole width of the marsh, which is not less than 15,000 feet wide.

Whatever may be done in deepening and improving the channel of the river, it is not to be lost sight of that this embankment is a dam at all times of high water when it overflows the banks of the river. These facts were probably well understood when the plan of crossing the marshes by an embankment was adopted, for levels were taken along the river to below Jack's reefs to determine what additional declivity might be given to the stream to increase the rapidity of its flow, and thus compensate for contracting its width and depth at Montezuma.

In the report before referred to, (page 116,) the engineer then in charge of the work of draining the marshes makes the following remarks:

"But for the removal of Jack's reefs and the bars above it, it

\* At this time the embankment of the enlarged canal reached only about half way across the marshes.



is not easy to see how it would have been practicable to prevent the enlarged canal from damming up the river in high water, to the great injury of the lands above, to, and including Ithaca, without very great cost in opening a wide and deep channel as low down the river as Campbell's island. Indeed it may well be questioned whether the obstruction could well be obviated effectually without some reduction of the bars all the way to Jack's reefs."

The whole declivity in the river, before any work was done at Jack's reefs, was from Montezuma to the head of the reefs but three feet and thirty hundredths in low water. The same engineer, in his report for 1856, (see Canal Commissioners' Report for that year, page 159,) says that Jack's reef "is in fact the lower end of Cayuga lake in high water." On the 25th day of April, 1855, the whole fall from Cayuga bridge to Jack's reefs was but 2.99 feet, the distance being twenty-eight miles, giving a declivity of less than eleven hundredths of a foot to the mile. This was before the embankment for the enlarged canal was made, and when no very extraordinary freshet was running in the river.

In 1857, as appears from the Commissioners' Report for 1858, page 112, the quantity of water running in the great freshet of November 15th was 15,269 cubic feet per second, which was fifty per cent. more than had been observed at any time previous, of which we have any record. And it is stated, on the same page, that all previous calculations had been based on 10,000 cubic feet per second as the maximum flow of the river. The same report, page 113, says, "this vast quantity of 15,000 cubic feet per second did not raise Cross lake (which is just above Jack's reef, and through which the river runs,) to old high water mark by one foot and thirty-two hundredths." This proved the value of the work done in cutting away Jack's reefs; and at this very time so much of the embankment of the enlarged canal had not been made as to allow 15,000 feet of water way over the bank of the old canal for the free passage of the freshet; and at this time the water stood 2.16 feet against the sides of the aqueduct at Montezuma.

It is fortunate for the State that the embankment was not then finished, so as to make a dam across the marshes; and it is also fortunate that the work at Jack's reefs was then completed, so

as to give four feet additional declivity to the river, thus enabling the water to pass away by a rapid flow.

In 1849, (before the work was done at Jack's reefs,) the Canal Engineers at Montezuma made observations in regard to the rate of subsidence of freshets. The reported result of the greatest subsidence was at the rate of about one and a quarter inches per day. In 1857, this great freshet subsided at the rate of 625.-1000ths, or about 8 inches per day, and in sixteen days it equaled four feet and a quarter, while in 1849, the rate of fall would not give more than a foot and a quarter. (See Commissioners' Report for 1858, page 115.)

The obligation resting on the State to save harmless the owners of lands above the aqueduct appears to have been conceded; and in 1858 a law was passed (chap. 179) directing the Commissioners "to dredge out the channel of the river for a sufficient distance above and below the aqueduct constructed for the purpose of carrying the Erie canal over the Seneca, Canandaigua and Clyde rivers, so as to allow the waters of these rivers *at all times* to pass off without obstruction or impediment, and as readily and as freely as they would naturally do if no improvement for the purposes of the canals were made; and the expense shall be paid out of any money appropriated to the enlargement of the Erie canal."

The work of draining the marshes under chap. 178 of the Laws of 1853, was prosecuted under the direction of the Hon. Henry Fitzhugh, Canal Commissioner, and George Geddes, Esq., Engineer, until the close of 1857, at which time Mr. Fitzhugh's term of office expired, and Mr. Geddes resigned in the following words: "The amount of work remaining to be done does not require the engineering force that has heretofore been necessary; and, having full confidence in the ability of the Assistant Engineer, Mr. Mason Loomis, to execute the work to your entire satisfaction, I hereby offer my resignation." Mr. Loomis was soon after relieved from further connection with the work, and it was placed under the direction of another engineer; and since that time has been prosecuted quite at variance with the plan that had been adopted by Messrs. Fitzhugh and Geddes.

The water was let through the cut at Jack's reefs, on the 21st day of January, 1857. In two weeks the water was reduced four feet in Cross lake—two feet ten inches at the bridge at Musquito Point, and about the same at the "direct" railroad bridge

—as appears by the Commissioners' Report for 1858, (page 111.) This proved the beneficial result of the work, and the soundness of the plan adopted originally; and the report goes on to say, (page 115,) "When Mosquito Point bar and the other bars in the river are removed up to the long bar over which the direct railroad passes, and the four feet that we have reduced the surface is brought up to 'Hard point' bar, the discharge will be freer than it is now, and the freshets will subside more rapidly. The present declivity (in low water of the river) from Montezuma to Hard point may be put at three inches to the mile. When the bars below are removed it will be a foot to the mile."

It would appear from this statement of the facts, that the simple mode of operations that was then demanded, was to commence with the first bar above Jack's reefs and remove it, and then to take the next, and so on, until the work of draining the marshes met the work then in progress below the canal at Montezuma. Had this course been adopted, all the work done for reclaiming the marsh lands would have aided and materially lessened the cost of the work of protecting the lands above the canal from the injurious effects of the embankment. In fact, it would have been doing just what true economy demanded to accomplish both, and each, of the objects aimed at, viz: draining the marshes and guarding against injuries that grow out of construction of the enlarged canal; and this plan must now or sometime hereafter be adopted, or neither of the ends will be attained.

When the surface of the river from Montezuma to Hard point, (which is below the direct railroad, and is more than five miles distant from Montezuma,) shall have a declivity of one foot to the mile, the water will run with such rapidity that a comparatively small channel will carry it, and the velocity will be sufficient to keep open the channel.

For a full statement of the effect on the river, of the work done at Jack's reefs, reference is made to the accompanying report of M. S. Kimball, Engineer, (see Appendix), under whose direction a full survey has been made during the last season; and attention is likewise called to his statement of the manner in which the work has been done on the various bars above Jack's reefs, and above the railroad bridge below the aqueduct, and the effect thereof.

Mr. Kimball has made estimates for completing the work on a plan of cuts sixty feet wide, and on a plan of cuts forty feet wide. For the particulars of these estimates his report is referred to.

It is respectfully recommended that the appropriation of last session be increased from \$25,000 to \$30,000, and that the restrictions in the act of last winter, as to security, be repealed. With such an appropriation the undersigned would feel at liberty to make cuts forty feet wide through all the bars—the effect of which being observed, would determine the necessity of widening the cuts to sixty feet, or prove that forty feet would be sufficient to accomplish the objects aimed at in the law of last session.

It is believed that cuts of forty feet wide will protect the State from future injuries from the embankment of the enlarged canal; but it may be a question whether to accomplish the work of draining the marshes, will not require cuts of sixty feet wide.

Claims to a heavy amount are already being made for timber destroyed by the raising of the water at Montezuma, and these claims are likely to increase. Thus, it is manifest, that the interests of the State call for the completion of this work at the earliest practicable period.

Experience proves that it is always unwise for the State to inflict injuries on the property of its citizens where it can be avoided at any reasonable cost, for it is certain to be paid for, sooner or later, at rates never less than the real value of the property injured or destroyed, and frequently at a great deal more.

The large sum expended by the State for the purpose of draining the marshes, under chapter 178, Laws of 1853, can none of it be assessed on the owners of the marsh and swamp lands, unless this work is carried to its completion substantially on the plan originally proposed.

In conclusion, the undersigned begs leave to state, as the result of a fair and careful examination of the whole project, and of the relation of the canal to these rivers and to Cayuga lake, that his convictions are clear that the plan of draining these marsh lands and removing these obstructions was wise and necessary in its inception, and would have produced all the beneficial effects claimed, if the money already provided had been judiciously expended, and the additional appropriations necessary had not been withheld.

**THE PRESENT CONDITION AND WANTS OF THE MIDDLE DIVISION, AND ITS NAVIGATION FOR THE PAST SEASON.****ERIE CANAL.**

On the portion of the Erie canal embraced in this Division, navigation has been attended with less interruption than heretofore, while the movement and the tonnage have been largely in excess of any former year. No break has occurred since navigation fairly opened; but there was a breach at May's point while the level was being filled, which somewhat impeded the opening. It was repaired, however, in time to pass all boats commencing their regular trips for the season. It grew out of an old grant to build a dry dock, the expense of this repair was paid by the superintendent—amounting to about \$600.

The most serious obstacle to a steady and regular movement of boats has been low water immediately east of Lodi locks, from midsummer well into October. In another portion of this report, the remedy for this detention is pointed out, and is being provided for so far as an additional supply of water is concerned; but this alone will not remove the evil complained of. It will be necessary to reduce the level of the canal bottom for about six miles, to Limestone creek feeder—say one foot at Lodi locks, and running up to six inches cutting at the feeder. The estimated cost of this work, which includes considerable excavation where the canal has never been reduced to bottom, is \$6,150. This improvement will also involve the necessity of removing or cutting down the crown of the arch to the Central railroad tunnel at Syracuse. No boats loaded to the regulation depth have been able to pass over this arch without detention, when the water was generally low on the level, or when it was drawn down directly over the tunnel by continued and rapid lockages.

In determining the question whether this work should be done at the expense of the State or of the railroad company, regard should be had to the fact that the elevation of this arch was determined by the Division and Resident Engineers employed on the canal at Syracuse when the structure was built.

Some hindrance and detention has also occurred at the junction of the Erie and Oswego canals, in the city of Syracuse, when *processions* of boats and rafts have come simultaneously from the Western Division and the Oswego, meeting at this point boats bound west. All the relief practicable would be found in the construction of a weigh lock at Oswego, (as recom-

mended in another place,) and in contemplated improvements on the Western Division.

There are no considerable feeders, except the Skaneateles lake and Nine Mile creek, to supply the Jordan, the Syracuse, the Salina and Liverpool, the Port Byron, the Montezuma, and the Cayuga levels, making in all about *sixty miles* of enlarged canals depending on these sources for supply, excepting only the lockages from the Western Division and the Rome level. It has not been found practicable to feed either from the east or west. During the dry months the great reliance has been on the Skaneateles, which has been taxed to its utmost capacity, and cannot always be depended on for an adequate supply for this long distance.

In determining the question of feeders for the western levels enumerated above, the Owasco outlet was suggested when our canals were enlarged, but the large price demanded for the diversion of this stream at Port Byron, (some \$86,000,) probably settled the question against its appropriation. It could be used as an auxiliary in feeding the Port Byron, the Montezuma, and the Cayuga levels, and thus relieve the Skaneateles and turn its waters mostly to the east. It is understood that this property, including the race of about two miles in length, can now be purchased for less than one-eighth of the sum formerly demanded. The race could be put in order, the bulkhead rebuilt, and a new feeder brought in at Port Byron, (above the lock,) through iron or cement pipes, for about \$12,000. It is respectfully recommended that this improvement be authorized, provided the property can be purchased at this reduced rate.

During the past year, the embankment across the Cayuga marshes has been fully completed. The light and unstable nature of the soil on which it stands has warned the Commissioner and others in charge, of the necessity of the utmost vigilance in providing against any movement or failure of the earthen walls on this portion of the canal, more especially as they cannot be replaced, without ruinous delay, during the season of navigation, and without heavy cost at any time.

In the month of August last, a most alarming sinking of the towing path bank occurred about ten chains west of the aqueduct. For the distance of about five chains, the entire bank seemed suddenly to settle into its frail foundation, leaving scarcely four feet of the remaining bank to hold the water, and

this being nearly vertical on its outer slope for six feet in depth. The cavity was promptly filled with proper material, and the toe of the bank secured by the use of brush and stone. Under a construction contract, (now closed,) about 4,700 yards of this material was laid on.

The work is not yet deemed entirely safe; and it is earnestly recommended, in view of the disastrous consequences which must ensue from the failure of any portion of it, it should be thoroughly secured, wherever indications of similar weakness are presented. The additional expense of this improvement is estimated at \$15,500.

Soon after the opening of navigation, the attention of the Commissioner in charge was called to the dangerous condition of the canal banks crossing the valley of the Brandy brook, a distance of about thirteen chains. This is about thirty miles east of Syracuse, and on the Rome level. The soil on which the banks rest, as well as the material of which they are composed, is exceedingly unreliable and treacherous. Since the enlarged canal was brought into use, and while the depth of water was limited to five feet, a heavy and expensive breach occurred at this point. Slides and sloughing off, daily increasing in magnitude, gave unmistakable indications that another and more serious disaster would interrupt navigation for many days, unless some expedient was promptly adopted to arrest the movement, more especially of the tow path bank. With the canal elevated nearly thirty feet above the surrounding country — a level of sixty miles in length, the water seven feet in depth — with no stop gates or ready made dams within twenty miles of this point, and with a culvert under the banks containing nearly 800 cubic yards of masonry, which would be partially or entirely destroyed by the breach, the Commissioner in charge deemed it hardly worth while to discuss the question of power to make the necessary expenditures to avert such a danger. The plan adopted was the putting in of piles driven down to near the surface of the ground, at the toe of the bank, in the rear of which was placed plank and timber, all making a base, from which was carried up gravel lining to the outside angle. It is believed that this plan affords good security against immediate danger; but it is recommended that this security shall be made perfect by adding a quantity of brush and stone, to receive the drainage. The cost of the piles and gravel-

ing is \$2,373.79, and the estimated cost of the brush and stone is \$504.

The inconveniences resulting from bench walls, though probably less felt than on the Eastern Division, are sufficient to make it very desirable that these obstructions should be removed as rapidly as the means therefor can be spared.

Though our enlarged canals have been declared "completed," their full capacity has not been tested. The maximum draft of boats is yet limited by the Canal Board to three inches (equal to 15 tons) less than was originally designed, and less than can be easily attained. With the coming season they should be placed in condition to realize their full value.

In order to secure the additional draft for boats at the opening of another season, as well as to attain greater safety to those parts of this valuable property which are liable to fail, it is respectfully recommended that a sufficient sum should be appropriated, as an extraordinary repair fund, to strengthen and perfect all of the banks and mechanical structures which indicate any weakness, or where there can be detected any want of stability or danger to navigation. Another important advantage from a moderate and judicious expenditure for these purposes will be found in making more distinct and specific the obligations of repair contractors. To prevent interminable disputes, and rid the State of questionable claims, the enlargement should be *really*, as well as *legally*, "completed," with such cheapening and modification of the plans, of course, as experience has proven to be judicious.

#### OSWEGO CANAL.

The navigation on this canal has continued without the slightest interruption throughout the season. With the exception of the old wooden dams and the construction of a weigh lock, alluded to in another part of this report, it needs no heavy outlay or expensive improvement. The most desirable is the erection of new lock houses. In rebuilding and enlarging the locks their locations were generally changed. The lock houses were old and not worth removing to the new sites. The consequence is that the lock tenders are generally compelled to live at a distance from their business, or to inhabit such shanties as they can afford to build. This is exceedingly detrimental to the proper and careful management of the locks. There are twenty-two of these structures necessary, which could be built at an expense of \$750 each, or \$16,500 in all.



## BALDWINSVILLE CANAL.

An examination of this canal, made early in the summer, satisfied the Commissioner in charge that but little further use of it could be made for the purposes of navigation, until the lock was rebuilt and the channel below the lock excavated. On referring the matter to the Board of Commissioners, who made a careful investigation as to the facts and the laws relating to this property, it was unanimously decided that this body had no power to expend money or create liabilities for this work, whatever might be its condition. Still it is the property of the State, and should either be disposed of, abandoned, or taken care of. The power "to sell, lease, or otherwise dispose of" this or any other canal, whether built by the State or purchased, being at least questionable, it is presumed it will not be exercised. Nor is it supposed that the State will abandon this or any other portion of its property; and this leaves no alternative but to restore it. In view of these circumstances, the Board passed the following preamble and resolutions:

*"Whereas*, the Baldwinsville canal is no longer in navigable order, in consequence of the dilapidated condition of the lock at Baldwinsville and the changes wrought by the State in the level of Seneca river;

*And whereas*, said Baldwinsville canal was purchased subsequent to the adoption of the Constitution of 1846, and therefore is not recognized in that instrument as part and parcel of the canals of this State, and is not entitled to be maintained from the Repair Fund, though being the property of the State ought to be maintained and kept in navigable condition, therefore

*Resolved*, That if the parties interested in the property on the line of said canal, and in its maintenance and navigation, shall make, or cause to be made, at their own expense, the required repairs and improvements for the resumption of its navigation, and said repairs and improvements shall be made within the estimated cost of estimate number four for Baldwinsville canal, submitted to this Board by Morris S. Kimball, Resident Engineer, viz: \$19,600, this Board, disclaiming all right and power to create a debt or liability of the State on account of said Baldwinsville canal, will nevertheless recommend to the Legislature, at its next session, that the cost of such repairs and improvements be reimbursed to said parties.

## CAYUGA AND SENECA CANAL.

With the exception of the first week of navigation, (the detention growing out of the failure of the old "composite" locks,) the largely increased business of this canal has met with no interruption.

In providing for its enlargement, its connection with the Seneca lake through the upper basin seems to have been overlooked. Under chap. 479, Laws of 1857, the Geneva level and river to Waterloo were excavated to the depth of nine feet; yet the basin, which forms the only entrance to this canal, in many places scarcely contains *four* feet of water. This harbor is formed by a break-water, running about one thousand feet into the lake in an easterly direction. This structure, which had been much neglected, is being thoroughly repaired by the repair contractor. A portion of the work is performed as a part of his yearly contract, and the balance is to be paid for from the appropriation; under a provision of the law of 1862, chap. 458.

To avoid the heavy swell caused by southeast winds, and afford a safe entrance to the harbor for the large fleets which daily enter it, (frequently containing fifty heavily laden boats,) an extension of the pier or break-water of 250 feet, and the removal of all obstructions from the entire area of the basin, will be absolutely necessary. As this lake never freezes, the excavations can as well be done in the winter months as at any other time; and this work should not be delayed in view of the spring business, and the want of the material excavated to complete the bank on the south side of the break-water. It is estimated that this improvement will cost \$15,000.

The remaining excavation of the artificial outlet into Seneca river is being made, as required by chap. 479, Laws of 1857.

Much embarrassment is experienced in the management of this canal, arising from the claim of the owners of the water-rights to control and regulate the waters at the Waterloo dam. To avoid this difficulty, while the canal was being enlarged, a contract was made to construct a new stone dam to be owned and controlled by the State, but the work has never been executed.

It is respectfully recommended that the relative rights of the parties be definitely determined, and that undisputed possession of the present dam be secured to the State, or that a new structure be erected.

## ITHACA INLET.

The last Legislature appropriated \$2,500 from the General Fund to remove the obstructions to the navigation of the inlet,

to raise a bridge over its waters, and to repair the pier at the entrance of the harbor. The removal of the obstructions has been accomplished at an expense of \$825. The bridge in question proved to be too much decayed to be raised; hence nothing further has been drawn from this appropriation. Contracts for the delivery of timber to repair the pier have been made, and it is expected that the work will be finished during the coming winter.

Another bridge, built and owned by the State, failed and fell down during the season. There being no appropriation applicable to the expense of rebuilding it, a citizen of Ithaca is constructing a new one, on the principle of Schneider's self-acting draw. The cost will be moderate and the structure substantial and durable. It is respectfully recommended that the required sum be appropriated, when the amount is ascertained, together with such further sum as may be necessary to complete the repairs on the pier.

#### CHEMUNG CANAL AND FEEDER.

On this canal there has been a very large increase of business in the past season, and the utmost exertions of the superintendent and repair contractor have been necessarily put forth to make it, in its present condition, equal to the heavy demands of its commerce.

Most of the locks being constructed of wood many years ago, have become much dilapidated, and to keep up good navigation through them at all times has been a task of considerable difficulty. In another portion of this report will be found some remarks in reference to the past and the future reconstruction of these locks.

The bad condition of the canal and river banks at Corning, so well and truthfully described in last year's report, remains unchanged, as the last Legislature failed to make any appropriation from which the necessary funds could be procured to afford adequate permanent relief. The banks, docks, etc., might have been restored on the original plan and the expense charged to the ordinary repair fund; but the objection to such an expenditure was that it would have cost quite as much as a better plan, and would be annually liable to the same deterioration. The recommendation of the late Commissioner in charge for a new channel or slip, is endorsed as the cheapest and safest improvement yet suggested.

There are two difficulties relating to the feeder of this canal: first, the incapacity of the present channel to pass the necessary quantity of water whenever there are rapid or continuous lockages; and second, the want of water during the dry months for

both the canal and the mills near Corning. It is claimed that the legal rights of the mill owners are yet unsettled and undetermined; but it is suggested that their claims may be terminated, so far as regards the future, by a resort to the Tyrone lakes for an additional supply of water. The expense of making these lakes a reservoir is believed to be moderate, but it is not yet ascertained.

The present feeder should be enlarged at certain points before the opening of navigation next spring. The expense, though not accurately determined, will not exceed \$10,000.

A considerable portion of this canal is exposed to severe injury by the sudden and heavy floods of Catharine creek, a stream washing the slopes of the canal banks for many miles. The State has heretofore been subjected to large expense, and the navigators to vexatious delays, from the breaches consequent on the overflow of this rapid stream. Five or six thousand dollars, economically expended, for stone and brush, it is believed would render the banks of the canal comparatively if not positively safe from further injury from this cause. If we judge of the future by the past, this expenditure will save more than \$25,000. Hence, the Commissioner in charge ventures to recommend it, on the newly discovered principle in political economy, that "it is easier to pay a large sum than it is to pay a larger one."

#### CHENANGO CANAL.

The navigation of this canal for the past season has been generally good—the exceptions being caused by a lack of water at the summit level, near Hamilton. The clearing off of the forests has so lessened the supply during early autumn, that an additional reservoir is much needed. Kingsley brook reservoir—the banks of which were broken soon after this canal was constructed, and never repaired—can easily be made available for this purpose. About one hundred acres of the flow land is the property of the State, though it has remained in the quiet possession of its original occupant for more than nineteen years.

The expense of reconstructing this reservoir, with additional flow lands, and some improvement of the feeder, is estimated at \$22,170.

It has been decided to rebuild five of the poorest of the locks during the coming winter. All of these structures are so much decayed that it would not be difficult to find scores of them which need renewing almost as much as those selected.

In deciding on the proposed "extension" of this canal it should

be regarded as a fixed fact that more than one hundred of these locks must soon be rebuilt, or its navigation entirely abandoned. In reference to the merits of this project, the undersigned has no information beyond what has been placed before the Legislature ; but it is suggested that if the State should undertake it, the cost be definitely determined in advance, by letting the work, (to the lowest bidder, as provided by the Constitution,) and paying for it when it is accepted by the State as in every respect complete.

#### CROOKED LAKE CANAL.

On this canal there has been an uninterrupted navigation for the past season. Like a portion of the Chemung, it is located in a valley, beside a rapid stream, which has frequently injured, and sometimes destroyed, the canal banks. Some further expenditures should be made to avoid, so far as possible, the recurrence of these injuries ; but the amount has not been estimated.

The old guard lock at Penn Yan is much impaired by time and use, and should be rebuilt. The cost of such improvement has not been ascertained.

#### REPAIRS OF THE CANALS BY CONTRACT.

The objections suggested to this system in former reports have not been altogether removed. Though there is no such marked improvement in the management of the repair contracts as would be desirable, the increased labor of the contractors, growing out of the heavy business of the last season on nearly all of the canals, has been performed with few exceptions with promptness and fidelity, and quite economically to the State. It is believed that the prejudice of forwarders and boatmen against the system is gradually lessening, and may be eradicated by a stern determination and resolute action on the part of the State authorities requiring a literal performance of the obligations of the contracts. In any event, the only substitute yet suggested, namely, a return to the wasteful if not corrupt expenditures by superintendents, ought not to be entertained.

It is believed that letting these contracts for the longer term of eight or ten years, would be found beneficial in their management. The contractors would cheerfully make many improvements which they now neglect, and perform much of their work in a more permanent and substantial manner than they are now inclined to do, in view of the probability that their competitors would reap the main advantage of their expenditures.

All of which is respectfully submitted.

WM. W. WRIGHT, *Canal Commissioner.*

## APPENDIX.

ENGINEER'S OFFICE,  
SYRACUSE, September 30, 1862. }

HON. W. W. WRIGHT, *Canal Commissioner* :

In obedience to your instructions, I have made an estimate: *First*, of the cost to finish the contract known as the contract for "removing obstructions from the Seneca river," and of the contract for the "draining of the Cayuga marshes;" *Second*, a survey, map, and profile, of the present condition of the whole improvement, together with an estimate of the cost to prosecute and complete the work on the basis of the law, chap. 465, of last winter, which is as follows: "An act to amend an act entitled an act for the removal of obstructions from the outlet of Cayuga lake and the channel of the Seneca river," which act appropriates \$25,000 therefor.

I am to presume that this law contemplates the improvement of the river to such an extent as to compensate for the embankment across the marshes at Montezuma, and the cutting off the Clyde river and turning it into the Seneca, above the aqueduct, and no farther.

A description of the river, and condition of the work heretofore done, is as follows:

The river originally had a fall in low water from the surface of Cayuga lake to the pond at Baldwinsville, a distance of 38 miles, of  $12\frac{84}{100}$  feet. Upon that portion between the canal at Montezuma (6 miles below the lake), and the pond at Baldwinsville, 32 miles, there was  $10\frac{5}{100}$  feet fall.

Upon the completion of the channel at Jack's reefs, nine miles above Baldwinsville, in 1857, the water was permanently lowered at Cross lake (a small lake lying above and about midway to the first bar)  $4\frac{1}{100}$  feet; and at Mosquito point, about half way to Montezuma,  $1\frac{54}{100}$  feet; at the central straight line railroad,  $\frac{46}{100}$ ; and at Montezuma,  $\frac{8}{100}$  feet.

Hon. George Geddes, with whose levels I now compare my work, and who reported in 1852 that the cutting out of Jack's reefs would lower Cross lake four feet, has been most admirably sustained in the result, as it has been permanently lowered four feet and over. His plan was also to cut through the remaining bars above, 10 in number, to the railroad bridge, channels of 20 feet, except at Hickory island, bar No. 5, 40 feet, and Mosquito point, bar No. 7, 60 and 140 feet. This plan, however, was increased during the progress of the work, making the Weedsport bar, No. 4, 60, and the Mosquito, No. 7, 100 feet, and finally in 1859 the plan of making none less than 60 feet was adopted.

The work as now done and left is substantially as follows:

Bar No. 1, (Skaneateles outlet,) 600 feet long, 60 feet wide, by ten feet deep, nothing done; is probably soft material.

Bar No. 2, (Bonta's bridge,) 1700 x 60 x 10, is doubtless hard; nothing done.

Bar No. 3, (above Bontas,) 500 x 60 x 10; soft; nothing done.

Bar No. 4, (Weedsport bridge,) 800 x 60 x 12; soft; has a completed channel, but has been dug two feet extra depth.

Bar No. 5, (Hickory island,) soft; has a channel dug 2,100 feet x 60 x 13, which is three feet extra depth, and 3,200 feet x 60 x 13 remaining.

Bar No. 6 (New bridge) is supposed to be soft; 1300 x 60 x 10; nothing done.

Bar No. 7 (Mosquito point) is of cemented clay and gravel, very hard, and has been dug 1300 feet x 100 feet wide x 10 feet deep, and 800 feet x 30 wide x 10 deep: there remains 100 x 100 x 10, and 70 x 30 x 10.

Bar No. 8, (Howland's bridge,) probably hard; 400 x 60 x 10; nothing done.

Bar No. 9, (Campbell's island,) dug 1900 feet x 45 x 9 feet, leaving 1900 x 15 x 9: balance of bar 200 feet, partly done; one-third very hard, two-thirds soft.

Bar No. 10, (Railroad bridge,) dug 2,100 feet, and one half the width, or 30 feet, 8 feet deep, and the other half, thirty feet, 5½ feet to "the deep hole," and from "the deep hole" to Campbell's island 1700 x 30 x 8; the remaining 30 feet not done, and the balance, 5,900 x 60 x 8, untouched and soft.

The above is all the work on the contract known as the "Draining the Cayuga marshes."

The condition of the balance, or the contract known as, "For the removal of obstructions from the Seneca River," is as follows:

From Railroad bridge to the mouth of the Canandaigua 5,300 feet x 50 x  $6\frac{1}{2}$ , and 1100 x 30 x  $6\frac{1}{2}$ ; soft.

From Canandaigua to toll bridge, 5,600 feet, the larger portion 80, and the balance 60 feet wide by 8 feet deep; soft.

From toll bridge to Montezuma aqueduct 3,300 feet, 150 x  $7\frac{1}{2}$ ; soft: also all excavations about and above the aqueduct done.

The question now is, What is the State required to do to compensate for the construction of the enlarged canal across the marshes, at Montezuma, and the shutting off and turning the Clyde river into the Seneca above the aqueduct, or in other words, how wide must cuts be made continuous through the several bars, to accomplish this object alone.

By reference to table A, it will be seen that the levels of Oct. 11th, 1851, taken by Mr. Geddes before the work at Jacks reefs was done, makes the surface of Cross lake  $5\frac{84}{100}$  feet below Cayuga lake, and the levels of August 25th, 1862, with Jack's reefs completed, makes it  $9\frac{85}{100}$  below, or a lowering of Cross lake of  $4\frac{1}{100}$ , which exceeds a little the original calculation of Mr. Geddes. This, in my judgment, should inspire the public with confidence in the results Mr. Geddes proposed to attain at all other points above.

Originally, in 1852, estimates were made for cuts 200 feet wide from Cross lake to the mouth of the Canandaigua, but of two feet less depth than those finally adopted, and on which the work has been lately progressing. It was proposed then to not only reduce the surface four feet at Cross lake, but four feet at Mosquito point, and three feet at the foot of Kipp's island, which for all practical purposes may also be called the same at the railroad bridge. This result produced at the "straight line railroad bridge," only three miles below the point in question, (Montezuma,) it must be evident to all reflecting minds, that it not only would have attained the object sought, but much more.

The plan, as finally adopted, and on which the work has been proceeding, was 60 feet wide, but of two feet greater depth, which is not so great a per centage less of water way as may at first appear.

Let it be borne in mind that the object to be accomplished upon the plan of the 60 feet cuts, and on the plan lately in progress, was to "*drain the Cayuga marshes,*" while the object now is to only compensate for the "*obstructions by the State*" at Montezuma.



For this purpose then, and it alone, I recommend the adoption of a 40 foot continuous cut through all the bars, as likely to be competent to produce the result. Upon this I present the following estimate, marked B, amounting to \$30,000.

For the purpose, however, of reclaiming the marshes, aside from the obligations resting upon the State growing out of the enlargement of the canal obstructing the water way at Montezuma, it may be necessary to widen these cuts to 60 feet, or possibly more, to enable the State to assess the money heretofore expended for redeeming them, but I would recommend a trial of the 40 foot cuts first, and see the effect.

Respectfully submitted.

M. S. KIMBALL, *Assistant Engineer.*

( A. )

*Levels of Seneca river from Montezuma to Cross lake, October, 1851, and August, 1862:*

	Levels.	
	Oct. 11, 1851.*	Aug. 25, 1862.
River at Montezuma aqueduct, below the surface of		
Cayuga lake .....	2.59	2.62
River at toll bridge .....	.....	2.82
do opposite mouth of Clyde river .....	2.82	3.23
do railroad bridge, (direct line) .....	3.52	3.98
do Hard point .....	3.99	4.64
do head Campbell's Island reef .....	4.16	5.18
do foot do do .....	4.34	5.47
do head Howland's bridge reef .....	4.34	5.47
do foot do do .....	4.42	5.75
do lower end of Maple Island .....	4.44	5.75
do head of Mosquito Point reef .....	4.52	6.06
do foot do do .....	4.99	6.64
do head of Hickory Island reef .....	4.99	6.67
do foot do do .....	5.40	7.40
do head of bar No. 3 .....	5.52	7.42
do foot do .....	.....	7.58
do head of bar No. 2 .....	.....	7.58
do foot do .....	5.74	9.28
do head of bar No. 1 .....	.....	9.28
do foot do .....	5.80	9.81
• Surface of Cross lake .....	5.84	9.85

\* Taken by Hon. Geo. Geddes.

[Assem. No. 6.]

(B.)

*Estimated cost at contract prices of a channel 40 feet wide through all the bars from Jack's Reefs to Montezuma; also to complete on plan as increased in course of construction.*

Location of bar.	As increased in course of construction.					To complete channel 40 feet wide.					
	No. of bar.	Length of bar	Size of cut.	Cont. price.	Cubic yards.	Amounts.	Length of bar.	Size of cut.	Cub. yards.	Amounts.	
Skaneateles outlet	1	600	60x10	26	3,000	\$800	600	40x10	2,000	\$520	
Bonta's bridge	2	1,700	60x10	26	10,000	2,600	1,700	40x10	7,000	1,820	
Above Bonta's	3	500	60x10	26	3,000	780	500	40x10	2,400	624	
Weedsport bridge	4	800	60x12	26	-----	-----	800	60x12	-----	-----	
Hickory Island	5	5,100	60x13	20	26,720	5,344	3,900	40x10	8,000	1,600	
New Bridge	6	1,300	60x10	26	3,500	910	1,300	40x10	1,800	468	
Mosquito point	7	2,200	100x10	15	13,182	1,977	2,200	100x10	13,200	1,980	
Howland's bridge	8	400	60x10	26	3,000	780	400	40x10	2,500	650	
Campbell's Island	9	2,100	60x9	26	8,393	2,182	2,100	40x9	2,500	650	
Railroad bridge	10	9,700	60x8	26	70,736	18,391	9,700	40x8	56,000	14,560	
Railroad to Clyde river	---	6,400	100x8	13	104,681	13,609	6,400	50x8	30,000	3,900	
Clyde river to toll bridge	---	5,610	150x8	13	76,098	9,892	---	---	---	---	
Toll bridge to aqueduct	---	3,300	150x7½	13	13,991	1,819	---	---	---	---	
Replacing old bridges	---	---	---	---	---	500	---	---	---	400	
						\$59,584					\$27,172
Add for contingencies						2,416					2,828
						\$62,000					\$30,000

## WESTERN DIVISION.

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It is required by law that the Canal Commissioners shall present a report to the Legislature, showing the condition of the canals, and of their proceedings for the fiscal year ending on the 30th day of September, and that the report shall be placed in the hands of the printer by the 10th day of December in each year. As the late Commissioner, having in charge the Western Division, has made a report in full to the 1st of January, 1862, the undersigned presents his first report, from the said 1st of January to the 1st of October, 1862.

The Western Division of the canals consists of that part of the Erie canal from the east line of Wayne county to and including the canal and canal basins and slips in the city of Buffalo, together with the Genesee Valley canal.

This division of the canals for superintendence and repairs is divided into eight repair sections, five being upon the Erie, and three upon the Genesee Valley canal. Those upon the Erie canal are sections Nos. 10, 11, 12, 13, and 14, and those on the Genesee Valley canal are Nos. 1, 2, and 3.

Of the Erie canal, sections 10 and 11 are in the charge of Zebulon Moore, sections 12, 13 and 14 are in charge of Chester F. Shelley, as superintendents of repairs.

### REPAIR SECTION No. 10.

This repair section is forty-two miles long, and extends from the east to the west line of Wayne county. The section is under contract to be kept in repair by George D. Lord, assignee of John C. Hunt, the contractor, for three years from the 4th of March, 1860, for the annual compensation of \$9,439.

The following are the mechanical structures upon the section:

- 23 timber road bridges,
- 11 iron road bridges,

- 9 timber farm bridges,
- 3 waste weirs,
- 3 composite culverts,
- 19 stone culverts,
- 1 discharge culvert,
- 10 stone locks, of which 8 are single,
- 2 aqueducts,
- 4 lock houses,
- 9 watch houses,
- 1 work shop, at Palmyra.

The following shows the depth, in feet, of water at the time of measurement, at the several points named upon the section, as reported by Superintendent Moore, for the several months of navigation of 1862:

				June.		July.		Aug.		Sept.	
				ft.	in.	ft.	in.	ft.	in.	ft.	in.
4,000 feet below lock No. 56.	....			6	1	----		----		5	11
2,500 do do	....			----		----		----		6	1
2,000 do do	....			6	2	----		----		6	3
1,000 do do	....			6	7	----		----		6	4
Lower mitre sill lock 56.	.....			6	4	6	5	6	5	6	6
do do 57.	.....			6	10	7	1	6	9	6	11
do do 58.	.....			7	1	7	0	7	0	7	2
Mud creek aqueduct.	.....			6	10	6	10	6	10	7	3
Lower mitre sill lock 59.	.....			7	5	6	10	6	8	7	0
do do 60.	.....			6	5	6	8	7	0	6	10
do do 61.	.....			6	10	----		6	10	7	2
do do 62.	.....			7	0	----		7	4	7	1
Palmyra aqueduct.	.....			7	0	6	11	7	1	7	2
Lower mitre sill lock 63.	.....			6	9	7	1	6	9	7	3
do do 64.	.....			6	11	6	11	7	1	7	4

The superintendent reports detention to navigation upon the section to 1st of October, fifty-four hours; of which twenty-nine hours were consumed in repairing lock gates and mitre sill; twelve hours in raising sunken boat at lock 59; and three hours in removing wedge of boats and a raft in Palmyra aqueduct.

Boats are often detained at the locks by reason of their being single, and unable to pass with equal rapidity the boats locked to them from the double locks below.

There have been no breaches upon the section.

Payments for repairs have been as follows:

To repair contractor, for his annual compensation....	\$7,433 25
To same, for repairs not embraced in his contract and certified to by division engineer.....	404 15
To paid same for rebuilding road bridge, in 1861, at the county line between Wayne and Seneca counties .....	153 50
To paid for snubbing posts and setting same.....	448 85
	<hr/> <hr/>
	\$8,439 75

## REPAIR SECTION No. 11.

This repair section is thirty-eight miles long, and extends from the east line of Monroe county to the west line of construction section No. 284, at the village of Brockport.

The section is under contract to be kept in repair by Chauncey Dodge, assignee of Myron H. Mills, the original contractor, for three years from the 1st of October, 1859, for the annual compensation of \$8,280.

The following mechanical structures are upon this section :

6 lift locks,	13 wooden road bridges,
1 guard lock,	22 iron road bridges,
1 weigh lock,	3 wooden tow path bridges,
2 stop gates,	1 iron tow path bridge,
1 aqueduct,	4 lock houses,
6 waste weirs,	1 work shop,
41 culverts,	5 watch houses,
2 wooden farm bridges,	1 dam.

The following table shows the depth in feet of the water upon the section, at the points named, as reported by Superintendent Moore :

	June.	July.	Aug.	Sept.
	ft. in.	ft. in.	ft. in.	ft. in.
Lower mitre sill, lock No. 65 .....	7 4	7 6	7 0	7 2
do do 66 .....	7 0	7 1	6 10	6 10½
do do 67 .....	6 9	6 10	6 9	6 7
do do 68 .....	6 11	7 4	7 0	6 11
do do 69 .....	7 3	6 11	7 4	7 2
Rochester aqueduct.....	7 0½	7 0½	7 1	7 2
Adams basin .....	7 3	7 4	7 3	7 3
East bridge, Brockport .....	.....	7 0	7 0	7 2

The superintendent reports total amount of detention on this section, twenty-six and one-half hours, all occasioned by accidents and necessary repairs to lock gates.

The locks on this section are all single, and it is a common occurrence for boats to be detained, waiting for lockage. At the time of the Knowlesville break, boats were detained without any movement eight days. No definite statement of the time lost during the season can be given, because, with the exception of the eight days before mentioned, boats have been constantly moving, although very slowly.

On sections 10 and 11, it has been necessary heretofore to stop locking boats, for the purpose of keeping up the levels below, by feeding through the locks. This detention has been obviated, by constructing sluices around locks where there were none, and by increasing the capacity of others.

The cost of keeping this section in repair for the nine months ending Oct. 1, is as follows:

To paid repair contractor for his annual compensation.....	\$6,520 50
To paid same for repairs not embraced in his contract, and certified to by division engineer .....	2,936 47
Paid for snubbing posts and setting same. ....	432 30
Paid for cutting down breast walls of waste weir at Brockport .....	58 04
	<hr/>
	\$9,947 31
	<hr/>

#### REPAIR SECTION No. 12.

This repair section is thirty miles long, and extends from the west end of construction section No. 284, at Brockport, to the west line of the county of Orleans.

This section had been under the charge of Lewis M. Loss, repair contractor, until the 3d day of February. At that date his contract was declared abandoned by the Contracting Board; a new contract was entered into with Edward A. Mills, for four and three-quarter years, from April 1st, 1862, for the annual compensation of \$6,700. The section during the interregnum was under the charge of the superintendent.

The following are the mechanical structures upon the section:

7 waste weirs,	
43 culverts,	11 road iron bridges,
20 road wood bridges,	3 farm wood bridges,
1 aqueduct,	1 dam, for feeder.
1 bulkhead, for feeder,	

The following table shows the depth of water on the section, as reported by Superintendent Shelley, at the points and at the times of the measurement in the months stated, at

	May.	June.	July.	Aug.	Sept.
	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.
Under first bridge west of Shelby basin.....	7 7	.....	.....	7 7	.....
do Shelby's basin bridge.....	.....	7 2	7 2	.....	7 6
do Ryan's bridge, Medina.....	7 9	.....	.....	7 9	7 6
Over Medina culvert.....	.....	.....	.....	.....	6 6
Under Hastings' bridge.....	.....	7 2	6 9	.....	6 5
Over road culvert.....	.....	6 3	6 3	.....	6 6
do Fish creek culvert.....	.....	7 2	.....	.....	.....
Under Knowlesville bridge.....	7 6	7 3	7 3	7 6	7 6
do Eagle harbor bridge.....	7 1	6 11	6 11	7 1	.....
do Gaines' basin bridge.....	6 11	.....	.....	6 11	.....
do Main street bridge, Albion.....	6 11	7 3	7 3	6 11	7 4
do Braley's bridge.....	7 9	7 6	7 6	7 9	.....
do Hindsburg bridge.....	6 11	6 9	6 9	6 11	.....
do Brockville bridge.....	7 1	.....	.....	7 1	.....
do Hulberton bridge.....	7 0	7 0	7 0	7 0	7 6
Over Holley embankment.....	.....	7 0	7 0	.....	7 3
At east end of section.....	7 3	7 6	7 6	7 3	.....

Two breaches occurred on this section. The first was at Knowlesville on the third of August. It was occasioned by the failure of a culvert, which went out, taking with it about one hundred feet in length of the tow-path bank. To make the culvert more secure a change of plan was made, which increased the cost of replacing over the old plan \$186.81, which amount was paid to the repair contractor. The detention to navigation at this point was five days.

The second break was in the berm bank about two miles west of Brockport, supposed to have been occasioned by musk rats working in the bank. It occurred on the 6th of September, was repaired at small expense, detention to navigation six hours.

No other detentions reported on the section.

The attention of the Commissioner was early called to the danger of permitting the culverts upon this section to remain in their then condition. The following passage from the last report of Commissioner Gardner properly explains this subject. See Commissioners' report, 1861, page 120 :

"Some of the structures upon the canals are badly built; as a class, upon the Western Division, the culverts were the worst built—the plan was defective, as to the mode of timbering and planking bottom of water-way, and in many cases the work of construction was badly done, particularly for the want of

thorough puddling, or other guards to prevent leaks from the canal around the culvert walls to their foundations."

"A large proportion of the breaks which have occurred upon the Western Division of the Erie canal have been caused by the failure of these structures; many of them now need overhauling and repairing; they should all be thoroughly examined, and such improvements and repairs made upon them before the opening of navigation next spring, as to secure them against all danger of failure."

The culverts were examined, and those deemed most dangerous were reconstructed or thoroughly repaired. It was intended that all should have been secured, but the very unfavorable winter and spring for the prosecution of such work prevented its accomplishment. The culvert which occasioned the break at Knowlesville was one of the faulty structures, and which had not been repaired during the winter; it was inspected and was believed to be safe, having been built eight years and no difficulty had been experienced with it.

It is highly important that the balance of the culverts should be repaired or reconstructed the coming winter, and thus a source of great vexation and serious damage to navigation and canal interest be removed.

A serious break occurred on this section on the 27th of September, 1861, by the giving way of the berm bank of the old canal, at the village of Holley, resulting, before the breach could be stopped, in the washing out of nearly the whole of the heavy embankment of the old canal across the gorge or ravine at that place. This break is now under repair, and will be completed before the opening of navigation another season. The amount of work done by the contractor to the 1st of October is \$13,320.

The breast walls of the waste weirs on this section were found to be from one and three-tenths to ten inches higher than the contemplated level of water in the canal, thus unnecessarily adding additional weight and pressure upon the banks in case of flood. The breast walls have been lowered to the proper line of canal level.

The following payments have been made for repairs on the section :

To paid repair contractor his annual compensation.	\$2,343 21
To paid same for repairs not embraced in his contract and certified to by the division engineer ..	1,364 84



To paid (by drafts) for repairing and reconstructing culverts.....	\$15,558 76
To paid (by draft) on account of repairing break at Holley.....	3,212 00
To paid for repairs, charged to repair contractor and deducted from his monthly payments.....	180 37
To paid for strengthening banks with stone and replacing bridges .....	167 24
Expended by superintendent.....	2,380 09
Total .....	<u>\$25,206 51</u>

## REPAIR SECTION No. 13.

This repair section is twenty-six miles long, and extends from the west line of Niagara county, to and including Pickard's bridge, across the Tonawanda creek.

The following are the mechanical structures on the section :

- 21 culverts,
- 2 State races,
- 4 waste weirs,
- 10 combined stone lift locks,
- 1 stone guard lock,
- 14 wood road bridges,
- 13 iron road bridges,
- 2 wood farm bridges,
- 1 iron tow path bridge,
- 4 wood tow path bridges,
- 1 wood foot bridge,
- 1 stop gate.

The following table shows the depth of water on the section, as reported by Superintendent Shelley, at the points and at the time of the measurements, in the months stated :

	May. ft. in.	June. ft. in.	July. ft. in.	Aug. ft. in.	Sept. ft. in.
Under Pickard's bridge.....	11 0	10 0	11 0	11 0	----
Under change bridge, Pendleton	8 0	----	8 0	8 0	8 0
At mitre sill, Sulphur Spring					
guard lock.....	10 0	11 0	10 0	10 0	11 0
Opposite Sulphur Spring House	----	9 0	----	----	----
Under Hawley's bridge.....	8 0	9 0	8 0	8 0	8 6
do Heacox's do .....	10 0	10 0	10 0	10 0	9 0
do Hitchin's do .....	10 0	9 5	10 0	10 0	9 6

	May. ft. in.	June. ft. in.	July. ft. in.	Aug. ft. in.	Sept. ft. in.
At mitre sill lower lock, Lock- port .....	6 8	----	----	6 8	6 8
Under Cady's bridge, Lock- port .....	----	----	----	----	7 8
Under Wakeman's bridge.....	7 8	7 0	7 0	7 8	----
do Orangeport do .....	7 6	7 0	7 0	7 6	7 10
do Gasport do .....	7 6	----	----	7 6	----
do Reynolds' basin bridge	7 5	----	----	7 5	7 6
do Watson's do .....	7 1	----	----	7 1	----
do Middleport do .....	7 1	7 2	7 2	7 1	7 6

The superintendent reports detentions as follows:

By the destruction of three lock gates in the berm tier of locks at Lockport, that tier could not be used for forty-eight hours.

Two boats sank at Sulphur Spring guard lock; delayed navigation six hours. A boat sinking at Lockport caused a delay of about eight hours.

The basin of the race around the locks at Lockport was destroyed in the spring of 1861. It was reconstructed in the spring of 1862; but was again carried away.

The expenditures for repairs upon this section are as follows:

Repair contractor, his annual compensation.....	\$7,717 44
To paid same for repairs not embraced in his contract, certified to by the division engineer.....	55 44
Expended by superintendent.....	4,329 69
	<hr/> <hr/>
	\$12,102 57

#### REPAIR SECTION No. 14.

This repair section is seventeen miles long, and extends from Pickard's bridge across the Tonawanda creek, to the city of Buffalo. The section is under contract to be kept in repair by William H. Douglas, contractor, for three years from the 1st day of March, 1860, for the annual compensation of \$14,500.

The following mechanical structures are upon this section:

- 47 road bridges,
- 55 farm bridges,
- 3 culverts,
- 2 locks,
- 1 ship lock,
- 2 foot bridges,

- 1 stone pier at Black Rock harbor,
- 1 protection pier, or break-water, for the basin,
- 1 jetty pier in Erie basin.

The following table shows the depth of water on this section, as found and reported by Superintendent Shelley, at the times of the measurement in the several months stated.

	May.	June.	July.	Aug.	Sept.
<b>BUFFALO—COMMERCIAL SLIP.</b>					
Under Canal street bridge.....	7 8	7 11	8 8	8 2	7 1
do Water do .....	7 8	7 11	8 8	8 2	7 1
<b>MAIN AND HAMBURG STREET CANAL.</b>					
Under Lloyd street bridge .....	10 0	10 3	11 0	10 6	9 5
do Main do .....	11 6	11 9	12 6	12 0	10 11
do Washington street bridge .....	10 6	10 9	11 6	11 0	9 11
Opposite Smith's boat yard.....	8 0	8 3	9 0	8 6	7 5
Under Michigan street bridge .....	7 8	8 9	9 6	9 0	7 11
do Railroad do .....	9 6	9 9	10 6	10 0	8 11
do Chicago do .....	9 0	9 3	10 0	9 6	8 5
do Louisiana do .....	6 0	6 3	7 0	6 6	5 5
<b>OHIO SLIP.</b>					
Under Perry street bridge.....	9 0	9 3	10 0	9 6	8 5
do Elk do .....	9 0	9 3	10 0	9 6	8 5
At entrance to Ohio basin.....	11 6	11 9	12 6	12 0	10 11
<b>OHIO BASIN.</b>					
East side basin—averages.....	10 0	10 3	11 0	10 6	9 5
South do do .....	10 6	10 9	11 6	11 0	9 11
West do do .....	11 0	11 3	12 0	11 6	10 5
<b>CLARK AND SKINNER SLIP.</b>					
Under Ohio street bridge.....	4 6	4 9	5 6	5 0	.....
do Elk do .....	4 0	4 3	5 0	4 6	.....
do Scott do .....	5 6	6 0	6 9	6 3	.....
do Perry do .....	5 9	5 9	6 6	6 0	.....
<b>SLIP No. 1, from Erie canal to Erie basin.</b>					
Under tow-path bridge .....		9 3	10 0	9 6	8 5
do Railroad do .....		8 3	9 0	8 6	7 5
do River street bridge.....		8 9	9 6	9 0	7 11
<b>SLIP No. 2, from Erie canal to Erie basin.</b>					
Under tow-path bridge .....	10 0	10 3	11 0	10 6	9 5
do Railroad do .....	10 0	10 3	11 0	10 6	9 5
do River street bridge.....	10 6	10 9	11 6	11 0	9 11
<b>ERIE CANAL.</b>					
Under Commercial street bridge.....	8 0	8 3	9 0	8 6	7 0
do Evans do .....	8 0	8 3	9 0	8 6	.....
do Erie do .....	8 0	8 3	9 0	8 6	6 9
do Genesee do .....	11 0	11 3	12 0	11 6	9 6
do upper Black Rock bridge .....		11 0	.....	.....	9 3
Guard lock, mitre sill .....	13 0	13 0	11 9	11 9	11 0
Under bridge, 6 miles west of Tonawanda .....		9 5	9 6	9 0	8 8
do 4 do do .....		9 2	9 6	9 6	9 0
Under change bridge, west of Tonawanda .....	7 0	.....	11 0	10 0	9 0
do Central railroad bridge.....	11 0	11 0	11 0	9 0	.....
Opposite Ira Bush's .....	11 0	12 0	11 0	11 0	.....

No detention to navigation has been reported upon this section, except at the guard lock at Black Rock, it being impossible at many times to pass boats through as fast as they arrive.

The Louisiana street bridge at Buffalo has been completed.

A wood bridge, with stone abutments, has been constructed at Hamilton street, Lower Black Rock, having been built in conformity to chapter 272, Laws of 1858, cost \$5,138.36.

The amount paid for repairs upon this section is as follows :

To paid repair contractor his annual compensation \$11,418.72.

#### NAVIGATION, CONSTRUCTION AND REPAIRS—ERIE CANAL.

The season of canal navigation to the 1st of October has been the most successful since the inauguration of canals in this State, not only in the increased quantity of property carried in the same time over any preceding year, but in the revenues accruing therefrom, and has been marked by less detention to navigation by casualties than usual.

The importance of keeping this channel in the best possible condition, cannot now be too highly estimated, and every exertion should be made to retain and to accommodate the large traffic depending upon the Erie canal.

The Legislature of this State, at their last session, enacted a law (chapter 169) which provides that the canals "shall be deemed and considered finished and completed," "and no more work shall thereafter be done, or materials procured, under pretence of enlarging and completing said canals," and limiting the powers of the Canal Board in the premises, "except to allow and certify to such works of extraordinary repairs and improvements in a completed canal, &c."

It was undoubtedly the intention of the Legislature that after the passage of the aforesaid act, that all original work should be done as extraordinary repairs, and the necessity or propriety of such to be determined by the Canal Board. Consequently after the 1st of September no more improvements could be made, as the Legislature adjourned without providing means. To retain the present business, to keep the canal in good working order, and to permit boats to draw six feet of water, numerous "extraordinary repairs" must be made.

The time for the bulk of work of this character to be done is during the suspension of navigation, and the short space of time that can be given from the action of the Legislature to the opening of the canal, renders it exceedingly important that no

delay should be permitted by your honorable bodies in providing such means as may be deemed expedient.

The Commissioner desires to ask for no improvements that have not been heretofore contemplated, preferring to present those of present need and importance, trusting to another year to provide means for increasing the capacity of the Erie canal and to facilitate the transit of the many boats navigating the same.

The following works are mentioned as being considered highly important, and nearly all proper to be classed as extraordinary repairs.

The accompanying map shows the basins, slips and canals in the city of Buffalo, and the attention of the Legislature is called to the urgent need of placing some of the slips and a portion of the canal in such condition that the numerous boats constantly arriving and departing from the city may have suitable facilities and accommodations.

The western termination of the Erie canal is at its junction with the Commercial and the Main and Hamburg street slips. The Main and Hamburg street slip extends in an easterly direction, and is connected with Buffalo harbor by the Prime and the Clark and Skinner slips, and with the Ohio basin by the Ohio slip; that portion of the slip lying east of Ohio slip has never been excavated to canal bottom. To make the slip serviceable, considerable original material must be taken out and the sides docked. This improvement is estimated to cost sixteen thousand dollars.

Prime slip is private property, is narrow, and has become so much filled with deposit as to be unreliable for navigation.

The Clark and Skinner slip was laid out by the city of Buffalo, and was proposed to be transferred to the State. The Canal Board, on the 18th of April, 1843, directed the Commissioner in charge to open and improve said slip at the expense of the State, provided that the Common Council of the city of Buffalo gave a release of the premises thus occupied. The Commissioner proceeded with the improvements without obtaining the releases above noted, and since that time the State has been in possession of said slip, and has expended almost every year since moneys for its maintenance. With a view to increase its capacity, the present Commissioner made a search for the plan upon which said canal was accepted by the State, when it

was found that they had no legal control over said slip; and, therefore, no authority to expend money in the premises. Upon this discovery, the city of Buffalo, and parties owning lands adjacent, tendered to the Canal Board full and sufficient releases to the slip, which said Board did not accept—deeming that, under existing laws, they had no power to accept the same, and that legislation must be had by the Legislature. The Commissioner earnestly requests that the Legislature, at an early day, declare said slip a part of the canals of the State.

The depth of water in the slip is in some places not over four feet, and cannot be used except for light boats.

The improvement of the slip is very necessary, as it is difficult and dangerous to pass boats into the harbor through any of the slips during the prevalence of strong westerly winds, except through Commercial slip and the circuitous route of the Ohio basin. Commercial slip is the main thoroughfare, and is almost constantly filled with boats, which at times occasion so great a crowd as to detain them. It is, therefore, considered highly important that the Clark and Skinner slip should now be opened, as it will open another channel to Buffalo harbor, tend to prevent the crowd of boats in Commercial slip, and can be used at all times. The estimated cost of the work is \$12,000.

Slips Nos. 1, 2, and 3 connect the Erie canal with the Erie basin. A dam had been constructed across slip No. 3, to prevent wash of sand into the canal. The jetty pier was partly intended to prevent this wash, and has been so far completed as to warrant the opening of the slip. All of the slips are of sufficient depth of water, except those noted.

The Erie canal, between Commercial slip and Erie street bridge, has not been enlarged, and when the water in the lake is driven back by easterly winds, (which is frequently the case,) boats get aground and cannot be moved, until the water returns. This portion of the canal should be deepened, that navigation can be maintained at this important point at all times. Cost \$1,500.

The Erie basin breakwater has been completed, in accordance with the plans heretofore determined upon.

The jetty pier is nearly completed; some work was done by the contractor, since the 1st of September, upon his responsibility and without permission or countenance from canal officers. The work done was very necessary to secure the pier from destruction. To complete the pier, coping stones should be placed

and bolted firmly down, and loose stones placed in rear to protect it from storms. The estimated cost of completion is \$4,000.

The guard lock at Black Rock is single; an additional lock is needed, as boats are frequently lying by waiting for lockage.

It will cost about \$35,000 to build an additional guard lock with necessary bulkheads.

A large amount of work was done, last winter and spring, by the contractors, on sections 361, 362, 363, 364, and 365, (between Buffalo and Tonawanda,) but the work was not completed, and under the operation of Laws of 1862, chaps. 165 and 169, the contracts were closed. The engineer estimates that there are 100,000 yards of material to be taken out, and 23,000 yards of slope wall to be built, to complete the sections as originally designed.

This part of the canal, which should be widened and deepened, is the great water way which supplies the enlarged canal with water, to the Montezuma marshes. The volume of water necessarily passed through creates a strong current, which embarrasses the upward movement of boats. If this work is completed the coming winter it is believed that the height of water kept in the canal, from Buffalo to Lockport, can be somewhat reduced, which would be of much importance to the inhabitants residing upon and adjacent to Tonawanda creek, whose lands are now flooded. It would also increase the capacity of the Lockport locks, for by keeping the level at its present height it overflows the lock gates, and floods boats, if too many are attempted to be locked through at a time.

The Commissioner begs earnestly to advise that provision be made for the completion of this portion of the canal, or at least sufficient to remove the earth from the bottom and sides of the canal, as contemplated in the original plan of enlargement. There are no feeders on the Western Division of the Erie canal, but through this channel—the Tonawanda creek and the Medina feeder; the two latter are unreliable and cannot be depended upon for any material service.

Some earth and rock was taken from the prism of the canal last winter, between Lockport and Rochester. Were it not for the unusually unfavorable weather and the difficulty of obtaining laborers, more excavation would have been done. The contractors on most of this line failed to prosecute their work with the requisite vigor, and State forces were put on, by whom the greater portion of the work was done.

The amount remaining to be taken out on the entire line, (excluding that part between Tonawanda and Black Rock and in Buffalo,) is estimated by Engineer Story as follows :

Repair section No. 10.....	\$3,000 00
do do 11.....	10,000 00
do do 12.....	33,000 00
do do 13.....	14,000 00
	<hr/>
	\$60,000 00
	<hr/> <hr/>

As before suggested, the culverts on section 12 should be put in secure condition. The estimated cost is eighteen thousand dollars. The Genesee River feeder dam should be rebuilt. The superintendent having in charge the Rochester section (No. 11) reported that navigation had been suspended eight days, occasioned by the Knowlesville break. The break was repaired in three days, and light boats passed over the same in less than eighty hours from the date of the accident, but the water had been drawn partially from the lower levels and had to be refilled from Buffalo. Owing to the large number of boats in transit, each acting as part of a dam to obstruct the flow of water, it required nearly ten days to reach the marshes. The superintendent of the section, which includes Knowlesville, reports the detention there at five days, a portion of which was consumed in filling the canal and feeding below.

There is no doubt had the feeder at Rochester been in use several days' navigation could have been saved, and there would have been little delay, except the detention to boats going west from Rochester.

By the plan submitted to and approved by the Canal Board, it is not intended to make the Genesee a permanent feeder, but only to be used in cases of emergency, and when not in use, the dam will not interfere with the ordinary condition of the stream.

The work is important and should not be delayed. The cost of this improvement is estimated at \$6,000.

There are fifteen locks between Rochester and Clyde—two of those are double, the rest are single. Knowing that detentions had occurred at those locks in 1861, and anticipating the large business of the present year, preparations were made to place them in good condition prior to the opening of navigation, and



every improvement that was likely to lessen detentions or to facilitate the passage of boats were made.

The gates, valves, flooring and mitre sills were repaired and strengthened, levels cut out, recesses cut in the head of the locks, that gates or locks might be repaired without drawing down the levels; sluices built around the locks, that no time should be lost in feeding through them; new gates framed and ready to replace such as should fail or be destroyed by accident; the shackle bars working the valves were changed for those less liable to be broken; walls at the head and foot of most of the locks were rebuilt or repaired; coping stones replaced and bolted down. After navigation, the forces were increased over the usual number, and agents were employed to keep boats moving both *day and night*.

Yet, owing to the increase of business and consequent increase in the number of boats, crowds collected, and it was impossible to prevent continued and embarrassing delays.

The increase of canal business is mostly from the west. The tolls received on all the canals of the State in the year 1861 was \$3,908,785, of which \$2,102,012 was taken at Buffalo. It is estimated that the increase of tolls at Buffalo the present year will be near fifty per cent., or about \$1,000,000; while the increase from the rest of the offices will not exceed fifteen per cent., or \$270,000. The following table exhibits the rapid increase of lockage at the first lock east of Rochester, and the guard lock at Black Rock, both single, for the years below named :

	1859.	1860.	1861.	1862.
Brighton lock.....	11,080	18,337	20,553	—
Guard lock.....	10,695	16,815	20,549	—

To, 1st of October, each year :

	1859.	1860.	1861.	1862.
Brighton lock.....	7,813	11,916	13,745	17,777
Guard lock.....	7,420	11,656	13,602	18,461

It should be remembered that heretofore business upon the canals has been largest in the spring and fall, and that a part of the summer has been styled the dull season. This year has been entirely different: business has been large and steady, and the *dull months* exhibit business as large as the spring months. Had the usual course of trade been continued, in this respect, it would have been impossible to have got through the single locks the amount of property transported this year. The tolls received in Buffalo,

and the crowds at the locks, is sufficient to demonstrate this fact. Received at Buffalo, May, 1862, (in round numbers), \$428,000 00

June, 1862.....	407,000 00
July, 1862.....	443,000 00
August, 1862.....	407,000 00
September, 1862.....	516,000 00

The receipts in June and July, 1861, were the smallest of that year, being, in June, \$231,000 ; July, \$217,000.

It is manifestly the interest of the State to increase the capacity of the canals, to facilitate the passage of boats, which aids not only to retain the present vast volume of property passing through, but provides for a prospective increase.

The large business of the past two years will cause the building of many boats, which, though adding to the tonnage capacity, cannot increase the tons of property carried, because their addition will only increase the pressure at the single locks, and increase the length of time consumed in the passages—thus costing more to the shipper, who seeks redress by adding the increased expense on the property.

Trade cannot be confined to any channel, but seeks that pathway which insures safety, rapidity and economy.

After very careful consideration of this subject—viewing the uniform and *unparalleled* steadiness of the business season, with the reasonable expectation that it will not be again as steady, and knowing the difficulties attending the prosecution of that business—the Commissioner has come to the conclusion *that the capacity of the Erie canal for the transportation of property at single locks has been reached*, and that it is very doubtful if the same quantity can be again passed through.

It is estimated that an additional tier of locks can be built for \$412,000, and the guard lock, Black Rock, for \$35,000.

It is believed that if the Legislature should, very early in the coming session, authorize the construction, and provide for the payment, the locks can be built, and probably all be brought into use, in the month of September, 1863.

Economy and convenience require that in cities and large villages iron bridges should be substituted when the present wooden structures are worn out. Bridges of this character should be built the coming winter, at the following places : One at Nunda, one at Mount Morris, one on Plymouth avenue, Rochester, two at Buffalo, on Michigan and Elk streets.

Some of these bridges should have been rebuilt, but there

being no means to construct them of iron, the authorities in most of the localities preferred to let them remain in their present dilapidated condition rather than to replace them again of wood, hoping that provision might be made at this session of the Legislature for this purpose. The expense of the improvement is not large, as the repair contractors are obliged to rebuild with wood, at their own cost—the State paying only the difference in cost between iron and wooden bridges.

The banks of the canal in places are not sufficiently strong, being narrow, and too low. In many instances they were not completed by the contractors as contemplated. Such work is not embraced in the repair contracts, it being intended that such contracts shall embrace no new or original work. Some work of this kind has been done this year where it was absolutely necessary. A large amount should be done the coming season.

Snubbing posts have been placed on the whole line of the Erie, it being ascertained that great damage was done to the banks, tow path, pavement, docking, and slope walls, by the hooks used in snubbing boats.

A large amount of work has been performed by the repair contractor and other agents, and it is believed that the Western Division of the Erie canal is in better condition than usual.

The following summary of the foregoing recommendations covers all the work considered necessary to obtain six feet draft of water for boats, and to keep the canal in the condition before mentioned in this report:

Main and Hamburgh street slip .....	\$16,000 00
Erie canal, between Commercial slip and Erie street bridge .....	1,800 00
Clark and Skinner slip .....	12,000 00
Jetty pier .....	4,000 00
Guard lock, Black Rock .....	35,000 00
Bottoming out and completing canal between Tonawanda and Black Rock .....	100,000 00
Bottoming out through the remainder of the canal .....	60,000 00
Repairing culverts, sec. 12 .....	18,000 00
Genesee river dam .....	6,000 00
Iron bridges (Erie canal) .....	4,000 00
Additional tier locks, 13 .....	412,000 00
Raising, widening, and strengthening banks .....	20,000 00
<b>Total .....</b>	<b>\$688,800 00</b>

The foregoing estimates are concurred in by the engineer of the Western Division.

### GENESEE VALLEY CANAL.

This canal extends from the Erie canal, in the city of Rochester, to the Allegany river, at Milgrove, 113 miles. The Dansville side-cut commences at the Shaker aqueduct, and extends to Dansville, a distance of 11 miles.

For the purposes of superintendence and repairs, it is divided into three sections. Sections 1 and 2 are at present in charge of F. H. Beckwith, having been in charge of D. D. Spencer until May. Section No. 3 is in charge of Gideon Searls.

#### REPAIR SECTION No. 1.

The section is 52 miles long, and extends from the junction of the Genesee Valley canal with the Erie canal at Rochester to the terminus of the Dansville side-cut at Dansville. It is under contract to be kept in repair by William McArthur, for five years from the 1st day of February, 1862, for the annual compensation \$8,472.

The mechanical structures upon this section are as follows:

- 19 lift locks,
- 3 guard locks,
- 4 dams,
- 3 bulkheads,
- 8 aqueducts,
- 57 culverts,
- 15 waste weirs,
- 44 road bridges,
- 64 farm bridges,
- 3 tow path bridges,
- 11 lock houses.

Immediately after the great flood of September 27th, 1861, the repair contractor upon this section abandoned his contract, and the repairs were commenced by Superintendent Spencer. A large proportion of his expenditures was for replacing the Shaker aqueduct (which was entirely destroyed,) and repairing the Dansville side cut canal.

The entrance to the canal from the Genesee river, at Mount Morris, was tortuous and nearly filled with shifting sands, and boats were frequently aground.

This channel has been widened and straightened, and has proved to be a very important improvement.

The payments for repairs upon this section are as follows :

To paid repair contractor his annual compensation..	\$4,200 70
To paid for repairs on Squakie Hill bridge.....	290 88
To paid same for raising banks near Buffalo street, Rochester, certified to by division engineer.....	169 19
To paid for protecting dam at Mount Morris, (services rendered 1861) .....	24 00
To paid expenses of State dredge widening and open- ing channel .....	726 31
Expend by superintendent*.....	7,740 16
Total payments.....	<u>\$13,151 24</u>

#### REPAIR SECTION No. 2.

This repair section is thirty-six miles long, and extends from the junction of the canal with the Dansville side-cut at the Shakers' settlement to and including the Genesee River feeder at Oramel.

The mechanical structures upon the section are the following :

- 61 lift locks,
- 1 guard-lock,
- 1 dam and bulkhead,
- 7 aqueducts,
- 30 culverts,
- 9 waste weirs,
- 35 road bridges,
- 28 farm bridges,
- 4 tow-path bridges.

The section is under contract to be kept in repair by George D. Lord, assignee of John Lambert, for five years from the 15th of March, 1861, for the annual compensation of \$12,540.

Several miles of the canal on this section were almost entirely destroyed by the disastrous flood of 1861. A large amount of work has been done to repair and place the canal in ordinary condition, and a further expenditure has been made to protect the banks from the effects of similar floods. The improvements that have been made were very necessary, and that portion of the canal is now in excellent condition.

\*The expenditures made by superintendent in December, 1861, are included in this amount.

The cost of repairs have been as follows :

To paid repair contractor his annual compensation..	\$9,875 35
To paid same for repairing break of September 27th, 1861, as certified to by division engineer.....	8,430 00
To paid contractor for constructing Fillmore bridge over Genesee river, at Hume.....	884 00
To paid contractor for constructing lattice bridge at Hume .....	153 00
<b>Total payments.....</b>	<b><u>\$19,342 25</u></b>

### REPAIR SECTION No. 3.

The section is thirty-eight miles long, and extends from the south bank of the Genesee river, at Oramel, below and including lock No. 72, to the Allegany river, at Millgrove pond.

The following mechanical structures are upon the section :

- 34 locks,
- 1 guard-lock,
- 4 aqueducts,
- 15 waste weirs,
- 23 culverts,
- 37 road bridges,
- 14 farm bridges,
- 1 tow-path bridge,
- 2 road and change bridges,
- 1 foot bridge,
- 5 lock houses,
- 1 overfall, at Rockville reservoir,
- 2 feeder dams.

The section is under contract to be kept in repair by Messrs. Luckey & Martin, assignees of Wm. McArthur, for five years from the 1st day of August, 1860, for \$7,433 per annum.

Payments for repairs have been as follows :

Paid repair contractor his annual compensation....	\$4,733 68
Paid same for repairs not embraced in contract, certified to by division engineer .....	6,101 89
	<b><u>\$10,835 57</u></b>

This section requires repairs to a large extent, having suffered in common with other portions from the flood before alluded to.

## EXTRAORDINARY REPAIRS.

The extension of the Genesee Valley canal was completed last December, and brought into use on the opening of navigation. This completes the construction of the canal, and the accounts have been closed.

The Genesee Valley canal was built 42 feet wide upon the surface, 26 feet wide on bottom, and to hold four feet of water. There is no vertical or slope wall on the canal, and consequently in many places the banks have slid in to so great an extent that loaded boats cannot pass each other. The boats on the canal average fourteen feet in width, so that were the canal in good condition it would then be difficult for two boats to pass each other. It now happens in some instances that loaded boats, when meeting, one or the other is obliged to retrace its course until a place wide enough is found to pass. Such places should be widened at the expense of the State, and by using ten thousand dollars a year judiciously for five years, navigation would be materially improved. The locks of the canal are of three kinds, some all wood, some composite, and some stone. Many of the wooden locks are in a miserably dilapidated condition, and must be soon rebuilt.

The waste weirs have been extensively repaired and brought into use; the most of them had been filled up, insecure, and were not available for the purposes designed.

The aqueducts are in fair preservation. The culverts seem to be well built, but there are not enough of them. At places small streams run into the canal where they are not needed as feeders, thus filling it with deposit and endangering its safety by floods.

The detentions have been numerous, rendering navigation very uncertain and difficult. A portion of the causes of those detentions have been removed, but the principal remedy is additional feeders or reservoirs to furnish a greater supply of water than is now afforded.

The past season was an unusually dry one, and detentions were numerous at Mount Morris, at the crossing of the river, on account of the want of water in the Genesee river to feed the canal and keep the pond full.

At Oramel, where the canal is fed from the Genesee, a dam was constructed so *that all the water in the river was turned into the canal*. There was no navigation on the summit level for twenty-eight continuous days prior to the date of this report. The sum-

mit is fed from the Ischua feeder and the Oil creek reservoir. The canal from Olean to Milgrove is fed mainly from Alleghany river and by the lockage water from the summit level.

All the water flowing through the Ischua creek was not diverted to the summit as early as it should have been. In ordinary seasons a large supply of water may be expected from that source. To get this supply, a new dam should be at once erected at this point, and a small reserve of water kept there, by increasing the height of the dam.

The present dam is a slight and worthless structure. The estimated cost of this dam and improving the head of the feeder is \$5,000. It is represented that no land damages will be incurred by the proposed improvement.

The banks of the Cuba reservoir should be raised four feet higher, allowing water in the basin to be raised three feet higher than at present. This increase would assist very materially, as it is estimated at fifty-five million cubic feet.

There is no doubt but the banks of the reservoir are capable of sustaining the increased pressure of water. It is believed that, in ordinary weather, such as is usual in that region, that with those improvements, and very great care in the use of water, that navigation could be continued the entire season.

The sliding in of the high banks at Portage has delayed navigation five days. Those banks should be so graded that this difficulty be removed. It is said that for several years there has been detention from this cause. It is estimated that this improvement will cost \$1000.

The banks, in places, are very high, and the Genesee river at their foot causes them to slide and fall off. Considerable strengthening is required, and at the York high embankment the earth must be removed from the berm side and put on the tow path side. The expenses of such necessary work is estimated at \$2,000.

The two trunk aqueducts at Portage are getting unsafe, and should be removed and earth embankments constructed in their stead. This work is proper, and will cost \$18,000. At least three locks must be rebuilt the coming year.

To build them of stone will cost near \$25,000; the cost of wood locks would be about \$16,000.

The business of this canal has largely increased the past season. A fair proportion of the increase is by reason of its con-



nection with the Allegany river. Milgrove is but twenty-eight miles from the great coal fields of McKean county, and this canal seems the natural channel for this coal to be brought to market.

It may become one of the most important tributaries to the Erie, and good faith requires that it shall be kept in navigable condition.

The canal is now in much better condition than in the spring, and while it is hoped that it is in an improving condition, it is but just to state that it still bears the evidence of many years' neglect.

The following is a summary of the "extraordinary repairs" proposed on the Genesee Valley canal:

Widening canal between high banks.....	\$10,000 00
Additional culverts.....	3,000 00
Dam for the Ischua feeder.....	5,000 00
Oil creek reservoir, (aside from land damages).....	3,000 00
Removing high bank at Portage.....	1,000 00
Raising and strengthening banks at and near York..	2,000 00
Removing trunk aqueducts at Portage and building earth canal.....	18,000 00
Rebuilding three locks.....	25,000 00
Iron bridges, Nunda, Mount Morris, and Rochester..	3,000 00
Total.....	<u>\$70,000 00</u>

The above estimates have been made by the engineer on the Western Division.

#### PAYMENTS TO 1ST OCTOBER, 1862.

The Commissioner in charge of the Western Division has issued drafts and certificates for work and materials done upon the canals, and for awards made by the Canal Appraisers, as follows:

#### *Enlargement Erie Canal.*

Drafts on account enlargement.....	\$57,150 45
do for engineering .....	17,294 81
do land damages.....	42,742 03
Certificates for land damages .....	111,559 82
do enlargement (final accounts).....	50,150 86
	<u>\$278,897 97</u>

*Enlargement Genesee Valley Canal.*

Drafts on account extension Genesee Valley canal.	\$612 00
Certificate (final account) extension Genesee Valley canal.....	14,770 88
Drafts for land damages extension Genesee Valley canal.....	423 90
Drafts for land damages Genesee Valley canal....	375 16
	<hr/>
	\$16,181 94
	<hr/>

*Repairs Erie Canal.*

Drafts for repairs.....	\$59,840 29
	<hr/>

*Repairs Genesee Valley Canal.*

Drafts for repairs.....	\$33,083 02
do engineering.....	2,181 82
	<hr/>
	\$35,264 84
	<hr/>

Drafts for Commissioner's salary.....	\$1,500 00
	<hr/>

Total amount drafts drawn and certificates issued..	\$391,685 04
	<hr/>

Payments in cash have been made by the Commissioner, from January 1st to October 1st, as follows :

*Erie Canal.*

For repairs outside of repair contracts.....	\$1,835 39
For repairs on section 12, charged to repair contractor and deducted from his draft.....	180 37
For temporary occupation of lands, &c.....	220 00
For snubbing posts and setting same.....	881 15
For tools purchased from repair contractor on section 12, and transferred to his successor.....	783 75
For publication of notices and printing.....	729 00
For clerk hire and traveling expenses of clerks of the Contracting Board and Board of Canal Commissioners, and the contingent expenses of the office in Albany.....	1,545 62
For clerk hire, rent, traveling expenses—as allowed by law—and other expenses of the Canal Commissioners' office in Buffalo.....	1,466 00

For police services in regulating boats and preventing detention .....	184 25
For other miscellaneous items .....	92 00
	<u>\$7,917 53</u>

*Enlargement Erie Canal.*

For printing and publishing notices .....	\$444 05
For claims for temporary occupation of land .....	306 00
For forces put on under contracts, and charged to the contractors .....	23,429 00
For excavating and removing original material on sec. 368, and guard lock section, in the year 1861 ....	2,981 86
For same on sec. 292, 290 and 361 .....	1,232 38
For removing towing path, Black Rock, obstructing water way .....	769 20
For raising bridges .....	2,535 81
	<u>\$31,698 30</u>

*Genesee Valley Canal.*

For publishing notices to contractors .....	\$817 80
For repairs outside of repair contracts .....	1,783 97
For dredging at outlet of canal, Mount Morris .....	726 31
For services rendered by Hiram Wood .....	3 00
Total .....	<u>\$3,331 08</u>

Total payments .....	\$434,631 95
Of which, are on account of Erie canal enlargement .....	\$310,596 27
On account repairs of the Erie canal .....	64,746 20
On account enlargement Genesee Valley canal .....	16,181 94
On account repairs of the Genesee Valley canal .....	38,595 92
On account of Commissioner's salary, clerk hire and office expenses .....	4,511 62
	<u>434,631 95</u>

F. A. ALBERGER,  
Canal Commissioner.

BUFFALO, October 1, 1862.

*Rates of toll established by the Canal Board on persons and property transported on the New York State canals, to take effect on the opening of navigation in 1862.*

*Provisions, &c.*

	cts.	m.	fr.
1. On bacon, per 1,000 pounds per mile.....	0	1	0
2. On lard, lard oil, tallow and grease, per 1,000 pounds per mile.....	0	1	5
3. On salted beef, salted pork, butter, cheese, bran and ship stuffs, oil meal and oil cake, per 1,000 pounds per mile.....	0	2	0

*Iron, Minerals, Ores, &c.*

4. On salt manufactured in this State, gypsum the pro- duct of this State, mineral coal, coal oil, brick and fire-brick, soda-ash, ice, sand, limestone, clay, earth, manure, pig and smelted copper, iron ore, and copper ore, and bar and pig lead, going towards tide water.....	0	1	0
5. On foreign salt, per 1,000 pounds per mile.....	0	2	5
6. On foreign gypsum, the product of other States, bloom, scrap and pig iron, iron bolts, broken castings, pot and pearl ashes, calcined plaster, fire-proof and hydraulic cement, bed plates for steam engines, plow castings and iron safes..	0	2	0
7. On leached ashes, bituminous coal, going towards and carried to tide-water, charcoal and petrol- eum or earth oil, per 1,000 pounds per mile..	0	0	5
8. On stove pipe and furniture for stoves, not cast iron, and barytes, per 1,000 pounds per mile.....	0	3	0
9. On lime and water lime, per 1,000 pounds per mile..	0	1	5
10. On iron car wheels and car axles, stoves and all other iron castings, except machines and the parts thereof, per 1,000 pounds per mile.....	0	3	0

*Furs, Peltry, Skins, &c.*

11. On furs, and skins of animals producing furs, per 1,000 pounds per mile.....	0	3	0
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	cts.	m.	fr.
12. On deer, buffalo and moose skins, per 1,000 pounds per mile .....	0	3	0
13. On green hides of domestic animals of the United States, per 1,000 pounds per mile .....	0	3	0
14. On imported raw-hides of domestic and other animals, per 1,000 pounds per mile .....	0	3	0

*Furniture, &c.*

15. On furniture, cabinet ware and chairs, per 1,000 pounds per mile .....	0	3	0
16. On carts, sleighs, carriages, wagons, mattresses, mechanics' tools, looking glasses, willow ware and piano fortes, per 1,000 pounds per mile ..	0	2	0

*Stones, Slates, &c.*

17. On tile for roofing, per 1,000 pounds per mile .....	0	2	0
18. 1. On wrought stone, per 1,000 pounds per mile ..	0	1	5
2. On all stone, unwrought or partly wrought, stone for the manufacture of lime and slate, per 1,000 pounds per mile .....	0	1	0

*Lumber, Wood, etc.*

19. On timber, squared and round, per 100 cubic feet per mile, if carried in boats .....	0	6	0
20. On the same, if carried in rafts, per 100 cubic feet per mile .....	1	0	0
21. On the same, if cleared after the first of June, and arriving at tide water before the 15th of September, inclusive, per 100 cubic feet per mile, ..	0	7	0
22. On the same, if not arriving until after the 15th of September .....	1	5	0
23. On lumber, carried in boats, when weighed, per 1,000 pounds per mile, viz:			
1. On white pine, white wood, cherry, bass wood, cedar, boards, plank, scantling, and all siding, lath and other sawed stuff, less than one inch thick, carried in boats (except such as is enumerated in rates Nos. 25 and 38) .....	0	2	0
2. On oak, hickory, beech, sycamore, black walnut, butternut, maple, ash, elm, fir, tamarack, yew and spruce .....	0	1	5
3. On hemlock .....	0	0	6

cts. m. fr.

On lumber carried in boats, when not weighed,  
per 1,000 feet per mile, viz:

4. On boards, plank, scantling and sawed timber, reduced to inch measure, and all siding, lath and other sawed stuff, less than one inch thick, (except such as is enumerated in rate No. 25,) tolls computed on surface measure; and all kinds of red cedar, cedar posts, estimating that a cord, after deducting for openings, will contain 1,000 feet, per 1,000 feet per mile.....	0	5	6
5. On hemlock, per 1,000 feet per mile.....	0	2	5
6. On subs. 4 and 5, if transported in rafts, per 1,000 feet per mile .....	2	5	0
7. On saw dust and empty barrels and casks, per 1,000 pounds per mile.....	0	1	0
On empty barrels and casks transported in rafts, per 1,000 pounds per mile.....	0	5	0
24. On mahogany, (except veneering,) reduced to inch measure, per 1,000 feet per mile.....	0	5	6
25. On sawed lath of less than ten feet in length, split lath, hoop poles, handspikes, rowing oars, broom handles, spokes, hubs, tree-nails, fellies, boat knees, ship knees, plane stocks, pickets for fences, and stuff, manufactured or partly manufactured, for boxes, chairs, or bedsteads, hop-poles, brush handles, brush backs, looking glass backs, gun stocks, plow beams, plow handles, per 1,000 pounds per mile.....	0	2	0
26. On ship knees transported in rafts.....	0	5	0
27. On staves and heading, undressed, transported in boats, per 1,000 pounds per mile.....	0	1	2
28. On staves and heading, sawed, cut and dressed, or partly dressed, shooks, stave butts and bolts not exceeding four feet and a half in length, and rived hoops transported in boats.....	0	2	0
29. On the same, if transported in rafts, per 1,000 pounds per mile.....	0	5	0
30. On shingles, carried in boats, per 1,000 pounds per mile .....	0	1	5
31. On shingles, in boats, per M. per mile.....	0	0	5

	cts.	m.	fr.
32. On the the same, if conveyed in rafts, per M. per mile .....	0	4	0
33. On split and round posts (not exceeding eight feet in length), and rails for fences (not exceeding fourteen feet in length), per M. per mile, carried in boats.....	3	0	0
34. On the same, if conveyed in rafts, per M. per mile...	8	0	0
35. On wood for fuel and tan bark, per cord per mile...	0	5	0
36. On the same, if transported in rafts, per cord per mile .....	2	0	0
37. On wood used in the manufacture of salt, per cord per mile.....	0	5	0
38. On sawed stuff for window blinds, not exceeding one-fourth of an inch in thickness, and window sashes and blinds, per 1,000 pounds per mile .....	0	6	0
39. On tan bark, ground, per 1,000 pounds per mile ...	0	2	5

*Agricultural Products, &c.*

40. On clover seed, grass seed, and dried fruit per 1,000 pounds per mile .....	0	4	0
41. On domestic distilled spirits and hops, per 1,000 pounds per mile .....	0	2	0
42. On wool, domestic cottons, and domestic woolens, per 1,000 pounds per mile.....	0	2	0
43. On cotton, per 1,000 pounds per mile.....	0	1	0
44. On live cattle, sheep, hogs, bones, (except for manure,) and rags, per 1,000 pounds per mile .....	0	2	0
45. On bones for manure.....	0	1	0
46. On horses, (except those used exclusively for towing boats or other floats,) per 1,000 pounds per mile .....	0	3	0
47. On horses used exclusively for towing boats or other floats, exempt from toll.			
48. On hemp and tobacco, going towards tide water, per 1,000 pounds per mile .....	0	1	0
49. On tobacco going from tide water, flax seed, apples, and potatoes, per 1,000 pounds per mile....	0	2	0
50. On corn, corn meal, and oats, per 1,000 pounds per mile .....	0	2	5

	cts.	m.	fr.
51. On flour, wheat, barley, rye, peas, beans, and junk, per 1,000 pounds per mile.....	0	3	0
52. On onions, turnips, all other esculent roots, pressed hay and pressed straw, per 1,000 pounds per mile .....	0	1	0
53. On all other agricultural productions of the United States, not particularly specified, per 1,000 pounds per mile.....	0	3	0

*Merchandise.*

54. On sugar, molasses, coffee, iron in bars, bundles and sheets, steel, boiler iron, nails and spikes, horse shoes, bridge iron and railings, gas and water pipes, crockery and glassware, flint and enamel ware, tar, turpentine, leather, varnish and iron safes, per 1,000 pounds per mile.....	0	2	0
55. On merchandise non-enumerated, going from tide water .....	0	1	0
56. On railroad iron and railroad chairs, per 1,000 pounds per mile.....	0	2	0
57. On threshing, mowing and reaping machines, fanning mills, plows, harrows and drill barrows, per 1,000 per mile.....	0	2	0
58. On powder, gunpowder, demijohns, trees and shrub- bery, per 1,000 per mile.....	0	4	0

*Articles not Enumerated.*

59. On all articles not enumerated or excepted, going towards tide water, per 1,000 pounds per mile	0	3	0
60. On the same going from tide water, except mer- chandise.....	0	2	0

*Boats and Passengers.*

61. On boats, propelled by steam, having preference at the locks over other boats, per mile.....	4	0	0
62. On boats, in tow of such steamboats, not exceeding five, and having such preference, per mile....	4	0	0
63. On boats, not propelled by steam, or in tow, and having such preference, per mile.....	4	0	0
64. On boats <i>used chiefly</i> for the transportation of pas- sengers upon <i>all canals</i> , per mile.....	4	0	0



	cts.	m.	fr.
On the same, if they elect to commute for tolls upon passengers .....	3	0	0
65. On boats <i>used chiefly</i> for the transportation of prop- erty, per mile .....	2	0	0
On the same, if they elect to commute for tolls upon passengers .....	2	3	0
66. On all persons over ten years of age, per mile .....	0	6	5

The following is a Schedule of all Repair Contracts let in pursuance of act, chap. 105, Laws of 1857, to the present time, and shows the commencement of the several terms, the canal or section embraced in the contract, the duration of each term, the annual compensation to the contractor, and the several amounts of cash deposits as security for the performance of the contracts.

Commencement of term.	Canal and section.	Duration of term.	Annual compensation.	Cash security.	Remarks.
Feb. 1, 1859.....	Oswego, section 2.....	3 years.....	\$12,899.....	.....	Expired February 1, 1862.
Feb. 1, 1859.....	Chemung and feeder.....	do.....	13,475.....	.....	do do
Feb. 1, 1859.....	Chenango, section 3.....	do.....	4,900.....	.....	Abandoned March 5, 1861.
Feb. 1, 1859.....	Erie, section 9.....	do.....	{ 4,995.....	.....	do do
Feb. 1, 1859.....	Erie, section 7.....	do.....	2,473.....	.....	Abandoned February 28, 1861.
April 1, 1859.....	Cayuga and Seneca.....	do.....	3,574.....	.....	Abandoned March 15, 1861.
May 1, 1859.....	Genesee Valley, section 1.....	do.....	4,800.....	.....	And 9 cents per cubic yard for excavation; abandoned
May 1, 1859.....	Genesee Valley, section 3.....	do.....	4,389.....	.....	Abandoned March 8, 1860. [Oct. 16, 1861.
May 1, 1859.....	Erie, section 10.....	do.....	6,190.....	.....	do May 1, 1859.
May 1, 1859.....	Erie, section 12.....	do.....	3,453.....	.....	do February 4, 1862.
May 1, 1859.....	Erie, section 13.....	do.....	5,495.....	.....	do December 19, 1860.
May 1, 1859.....	Champlain, section 1.....	do.....	8,973.....	.....	do April 2, 1860.
May 1, 1859.....	Champlain, section 2.....	do.....	6,800.....	.....	do do
May 1, 1859.....	Champlain, section 3.....	do.....	6,350.....	.....	do do
May 1, 1859.....	Erie, section 2.....	do.....	7,900.....	.....	do October 8, 1859.
May 1, 1859.....	Erie, section 3.....	do.....	7,440.....	.....	do do
May 1, 1859.....	Erie, section 4.....	do.....	8,849.....	.....	Expired May 1, 1862.
May 1, 1859.....	Erie, section 5.....	do.....	2,995.....	.....	Abandoned August 20, 1862.
May 1, 1859.....	Oswego, section 1.....	do.....	2,800.....	.....	Expired May 1, 1862.
Oct. 1, 1859.....	Erie, section 10.....	do.....	7,800.....	.....	Abandoned October 8, 1860.
Oct. 1, 1859.....	Erie, section 11.....	do.....	8,290.....	.....	Expired October 1, 1862.
March 1, 1860.....	Erie, section 14.....	do.....	14,500.....	.....	do do
Oct. 1, 1859.....	Erie, section 8.....	do.....	7,000.....	\$2,000	
Nov. 1, 1859.....	Improvement of Black river.....	5 years.....	8,800.....	2,000	
March 4, 1860.....	Erie, section 1.....	3 years.....	28,440.....	4,000	
March 4, 1860.....	Erie, section 2.....	do.....	9,700.....	2,000	
March 4, 1860.....	Erie, section 5.....	do.....	8,890.....	2,000	
March 4, 1860.....	Erie, section 10.....	do.....	9,430.....	2,000	
August 1, 1860.....	Champlain, section 1.....	5 years.....	8,659.....	2,000	Abandoned June 1, 1862

August 1, 1860.....	Champlain, section 2 .....	do .....	9,300	2,000
August 1, 1860.....	Champlain, section 3 .....	do .....	4,300	2,000
August 1, 1860.....	Genesee Valley, section 3.....	do .....	7,433	2,000
Oct. 1, 1860.....	Oswego Lake and feeder.....	do .....	2,375	2,000
Oct. 1, 1860.....	Crooked Lake.....	do .....	2,849	2,000
Oct. 1, 1860.....	Chenango, section 1 .....	do .....	11,500	2,000
Oct. 1, 1860.....	Chenango, section 2 .....	do .....	6,600	2,000
March 1, 1861.....	Black River, section 2 .....	do .....	4,178	2,000
March 15, 1861.....	Erie, section 13 .....	do .....	9,800	4,000
March 15, 1861.....	Genesee Valley, section 2.....	do .....	12,640	2,000
May 1, 1861.....	Erie, section 7 .....	do .....	3,480	4,000
May 1, 1861.....	Erie, section 9 .....	do .....	7,000	4,000
May 1, 1861.....	Black River, section 1 .....	do .....	8,700	4,000
May 1, 1861.....	Chenango, section 1 .....	44 years	13,990	4,000
May 1, 1861.....	Chenango, section 3 .....	5 years	7,000	4,000
June 1, 1861.....	Cayuga and Seneca.....	do .....	4,480	4,000
May 1, 1862.....	Erie, section 3 .....	4 years	10,900	4,000
May 1, 1862.....	Erie, section 4 .....	44 years	12,780	4,000
May 1, 1862.....	Erie, section 8 .....	4 do	4,940	4,000
Nov. 1, 1862.....	Erie, section 11 .....	4 + do	11,900	4,000
Nov. 1, 1862.....	Erie, section 12 .....	4 + do	6,700	4,000
April 1, 1862.....	Champlain, section 1 .....	41 do	13,845	4,000
Oct. 1, 1862.....	Oswego, section 1.....	41 do	9,000	4,000
May 1, 1862.....	Oswego, section 2 .....	43 do	11,900	4,000
May 1, 1862.....	Cayuga and Seneca.....	43 do	9,950	4,000
July 1, 1862.....	Chenung and feeder.....	43 do	15,960	4,000
April 1, 1862.....	Genesee Valley, section 1 .....	43 do	8,472	4,000
Feb. 1, 1862.....		5 do		

Abandoned March 5, 1861.

Abandoned April 15, 1862.

TABLE

*Exhibiting the date of the Opening and the Closing of the Hudson River, and the Number of Days Open; also the time of Commencement and Close of each Navigable Season of Canals, and the Number of Days of Navigation since 1824; also the date of the Opening of Lake Erie, since 1827.*

Opening and closing of the Hudson river.			Commencement and close of navigation of Erie canal.			Opening of the lake.
River open.	River closed.	Open days.	Canal open.	Canal closed.	Navigable days.	
March 3, 1824.....	Jan. 5, 1824.....	309	April 30, 1824.....	December 4.....	219	
March 6, 1825.....	Dec. 13, 1825.....	283	April 12, 1825.....	do 5.....	238	
February 26, 1826.....	Dec. 24, 1826.....	302	April 20, 1826.....	do 18.....	243	
March 20, 1827.....	Nov. 25, 1827.....	251	April 22, 1827.....	do 18.....	241	21, 1827
February 8, 1828.....	Dec. 23, 1828.....	220	March 27, 1828.....	do 20.....	269	April
April 1, 1829.....	Jan. 14, 1829.....	286	May 2, 1829.....	do 17.....	230	May
March 14, 1830.....	Dec. 25, 1830.....	283	April 20, 1830.....	do 17.....	242	5, 1830
March 15, 1831.....	Dec. 6, 1831.....	263	April 16, 1831.....	do 21.....	230	8, 1831
March 25, 1832.....	Dec. 21, 1832.....	289	April 25, 1832.....	do 12.....	241	27, 1832
March 21, 1833.....	Dec. 13, 1833.....	277	April 19, 1833.....	do 12.....	238	23, 1833
February 29, 1834.....	Dec. 15, 1834.....	291	April 17, 1834.....	do 12.....	240	April
March 25, 1835.....	Nov. 30, 1835.....	268	April 15, 1835.....	November 30.....	230	6, 1834
April 4, 1836.....	Dec. 7, 1836.....	248	April 25, 1836.....	do 26.....	216	8, 1835
March 27, 1837.....	Dec. 14, 1837.....	261	April 20, 1837.....	December 9.....	234	27, 1836
March 19, 1838.....	Nov. 25, 1838.....	257	April 12, 1838.....	November 25.....	228	April
March 25, 1839.....	Dec. 18, 1839.....	286	April 20, 1839.....	December 16.....	241	31, 1838
February 25, 1840.....	Dec. 5, 1840.....	285	April 20, 1840.....	do 9.....	228	April
March 24, 1841.....	Dec. 19, 1841.....	286	April 20, 1841.....	November 29.....	221	11, 1839
February 4, 1842.....	Nov. 23, 1842.....	308	April 20, 1842.....	do 28.....	221	14, 1841
April 13, 1843.....	Dec. 10, 1843.....	243	May 1, 1843.....	do 30.....	214	April
March 18, 1844.....	Dec. 17, 1844.....	278	April 18, 1844.....	do 29.....	232	7, 1842
February 24, 1845.....	Dec. 4, 1845.....	283	April 16, 1845.....	do 25.....	228	May
March 18, 1846.....	Dec. 14, 1846.....	275	April 16, 1846.....	do 25.....	224	14, 1844
April 7, 1847.....	Dec. 25, 1847.....	263	May 1, 1847.....	do 30.....	214	3, 1845
March 22, 1848.....	Dec. 27, 1848.....	292	May 1, 1848.....	December 9.....	223	April
March 19, 1849.....	Dec. 26, 1849.....	286	May 1, 1849.....	do 5.....	219	23, 1847
						9, 1848
						25, 1849

March 10, 1860.....	17, 1850.....	253	April 22, 1850.....	do	11.....	234	March 25, 1850
February 25, 1851.....	Dec. 14, 1851.....	293	April 15, 1851.....	do	6.....	235	April 2, 1851
March 23, 1852.....	Dec. 23, 1852.....	270	April 20, 1852.....	do	16.....	239	April 20, 1852
March 23, 1853.....	Dec. 21, 1853.....	274	April 20, 1853.....	do	20.....	245	April 14, 1853
March 17, 1854.....	Dec. 8, 1854.....	266	May 1, 1854.....	do	3.....	217	April 29, 1854
March 27, 1855.....	Dec. 20, 1855.....	268	May 1, 1855.....	do	10.....	224	April 21, 1855
April 11, 1856.....	Dec. 14, 1856.....	248	May 6, 1856.....	do	4.....	214	May 2, 1856
February 27, 1857.....	Dec. 27, 1857.....	303	May 6, 1857.....	do	15.....	233	April 27, 1857
March 20, 1858.....	Dec. 17, 1858.....	273	April 28, 1858.....	do	8.....	225	April 15, 1858
March 13, 1859.....	Dec. 10, 1859.....	273	April 16, 1859.....	do	12.....	242	April 1, 1859
March 6, 1860.....	Dec. 14, 1860.....	283	April 25, 1860.....	do	10.....	232	April 17, 1860
March 5, 1861.....	Dec. 23, 1861.....	294	May 1, 1861.....	do	10.....	224	April 13, 1861
April 4, 1862.....	Dec. 19, 1862.....	259	May 1, 1862.....	do	10.....	224	

## SCHEDULE

*Of contracts let by Board of Canal Commissioners under acts, chaps. 327, Laws of 1854, and 554 of 1855, showing the commencement of the several terms, the canal or section embraced in the contract, the duration of each term, and the annual compensation to the contractors.*

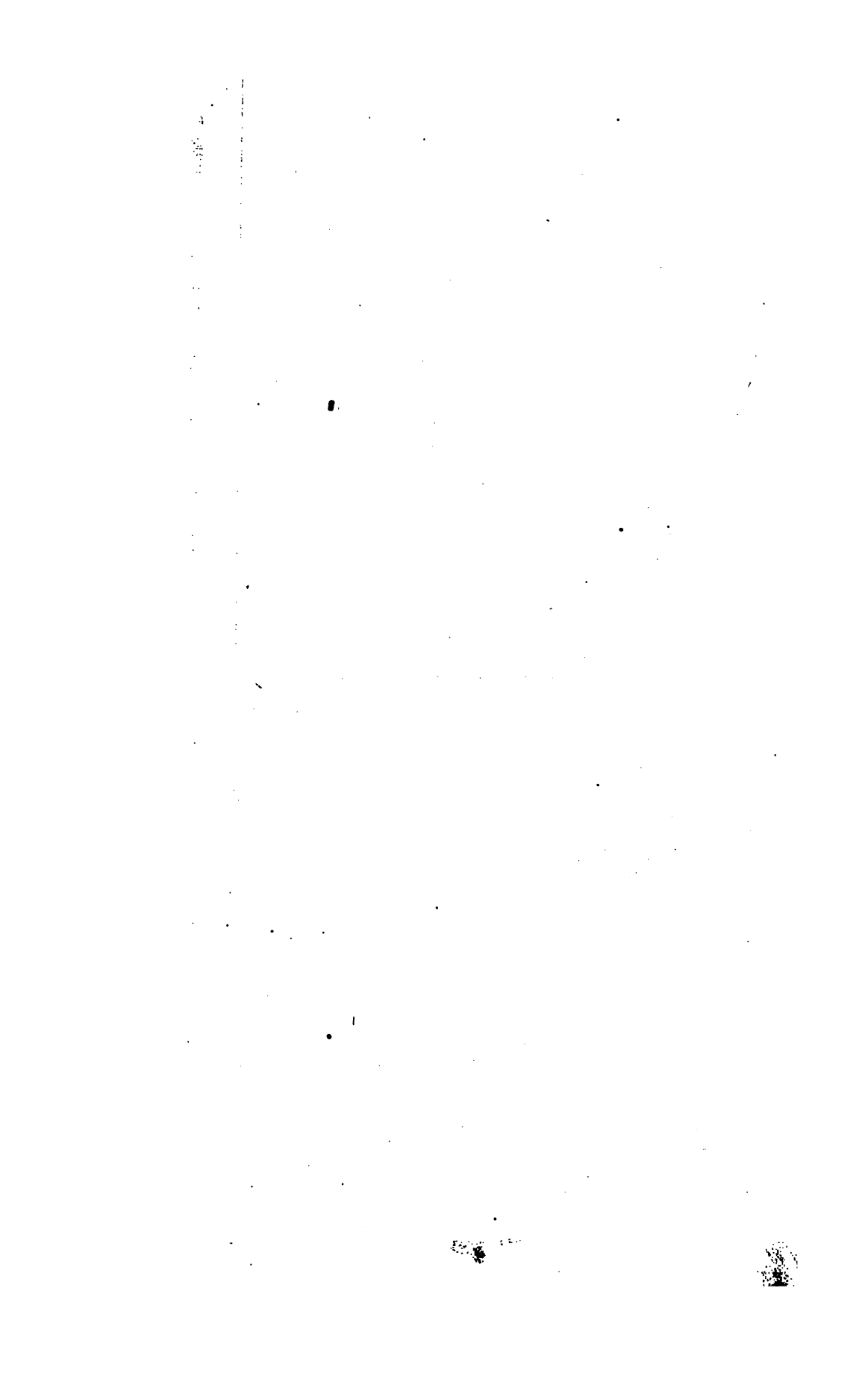
Commencement of term.	Canal and section.	Duration of term.	Annual compensation	Remarks.
Oct. 1, 1854--	Section 8, Erie canal-----	5 years	\$7,370	Expired October 1, 1859
Mar. 1, 1855--	Section 1, Erie canal-----	5 years	43,000	Expired March 4, 1860
Oct. 1, 1855--	Section 1, Chenango canal-----	5 years	14,700	Expired October 1, 1860
Oct. 1, 1855--	Section 2, Chenango canal-----	5 years	6,000	Expired October 1, 1860
Oct. 1, 1855--	Oneida Lake canal-----	5 years	3,975	Expired October 1, 1860
Oct. 1, 1855--	Crooked Lake canal-----	5 years	4,473	Expired October 1, 1860
Jan. 1, 1856--	Section 1, Black River canal-----	5 years	3,999	Expired January 1, 1861
Jan. 1, 1856--	Section 2, Black River canal-----	5 years	9,985	Expired January 1, 1861
Apr. 15, 1858--	Addition to sec. 2, Black River canal. See chap. 185, Laws of 1858-----	-----	-----	Expired January 1, 1861
Feb. 1, 1856--	Section 2, Chenango Valley canal-----	5 years	13,900	Expired February 1, 1861

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35

AMT

and a362, inclusive.

ngt.	les.	Total cost of repairs.	Total average per mile.
ars. ge per le.			
1822 --	)	\$232,473	\$528
1822 --	)	234,433	490
1822 --	)	254,433	509
1832 -	)	221,005	442
1832 -	)	180,773	361
1832 -	)	344,917	690
1832 -	)	372,789	694
1832 -	)	478,964	879
1832 -	)	432,118	793
1832 -	)	406,122	745
18378 l	)	492,144	766
18389 l	)	481,774	750
18398 l	)	379,769	591
18407 )	)	460,686	664
18413 )	)	357,828	511
18425	)	452,559	646
18432	)	383,076	547
18449	)	464,329	663
18451	)	520,452	743
18462	)	510,355	729
18479	)	496,424	709
18481	)	674,777	964
18498	)	521,122	744
18509	)	626,950	823
18512	)	722,259	762
18520	)	824,533	929
18533	)	789,082	901
18547	)	960,265	1,082
18552	)	781,688	868
18563	)	616,014	684
18572	)	752,575	828
18584	)	878,721	958
18596	)	630,615	688
18604	)	356,966	412
18613	)	360,187	410
18626	)	342,817	371





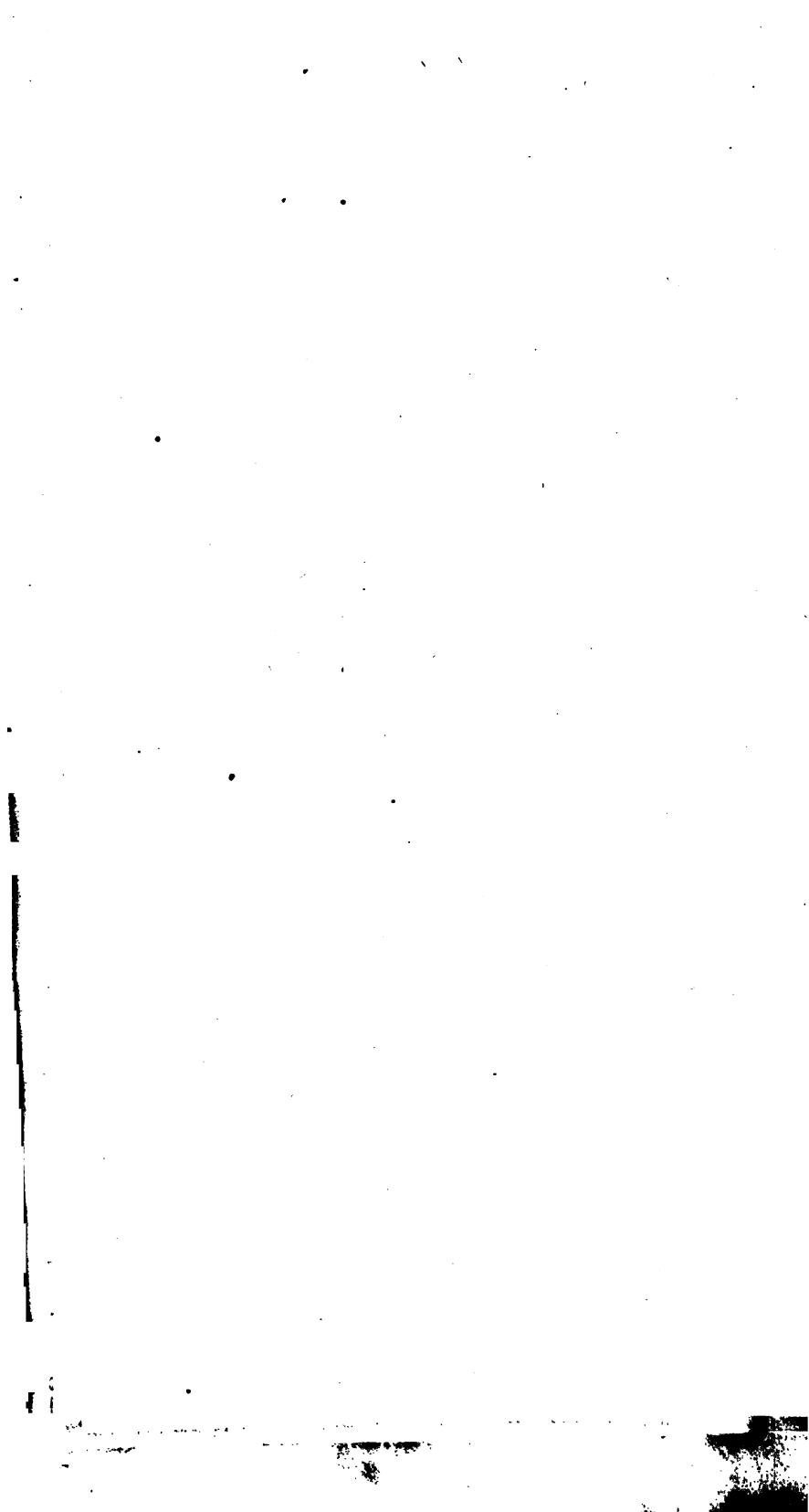
TABLE

*Exhibiting the date of the Opening and the Closing of the Hudson River, and the Number of Days Open; also the time of Commencement and Close of each Navigable Season of Canals, and the Number of Days of Navigation since 1824; also the date of the Opening of Lake Erie, since 1827.*

Opening and closing of the Hudson river.			Commencement and close of navigation of Erie canal.			Opening of the lake.
River open.	River closed.	Open days.	Canal open.	Canal closed.	Navigable days.	
March 3, 1824.....	Jan. 5, 1824.....	309	April 30, 1824.....	December 4.....	219	21, 1827
March 6, 1825.....	Dec. 13, 1825.....	283	April 12, 1825.....	do 5.....	238	1, 1828
February 25, 1826.....	Dec. 24, 1826.....	302	April 20, 1826.....	do 18.....	243	April 1, 1828
March 20, 1827.....	Nov. 25, 1827.....	261	April 22, 1827.....	do 18.....	241	April 10, 1828
February 8, 1828.....	Dec. 23, 1828.....	220	March 27, 1828.....	do 20.....	269	May 6, 1830
April 1, 1829.....	Jan. 14, 1829.....	286	May 2, 1829.....	do 17.....	230	May 8, 1831
March 14, 1830.....	Dec. 25, 1830.....	283	April 20, 1830.....	do 17.....	243	May 8, 1831
March 15, 1831.....	Dec. 6, 1831.....	263	April 16, 1831.....	do 1.....	230	May 27, 1832
March 25, 1832.....	Dec. 21, 1832.....	289	April 25, 1832.....	do 21.....	241	April 28, 1833
March 21, 1833.....	Dec. 13, 1833.....	277	April 19, 1833.....	do 12.....	238	April 6, 1834
February 29, 1834.....	Dec. 15, 1834.....	291	April 17, 1834.....	do 12.....	240	May 8, 1835
March 25, 1835.....	Nov. 30, 1835.....	268	April 15, 1835.....	November 30.....	230	May 27, 1836
April 4, 1836.....	Dec. 7, 1836.....	248	April 25, 1836.....	do 26.....	216	May 16, 1837
March 27, 1837.....	Dec. 14, 1837.....	281	April 20, 1837.....	December 9.....	234	March 31, 1838
March 19, 1838.....	Nov. 25, 1838.....	287	April 12, 1838.....	November 25.....	228	April 11, 1839
March 25, 1839.....	Dec. 18, 1839.....	286	April 20, 1839.....	December 16.....	241	April 27, 1840
February 25, 1840.....	Dec. 5, 1840.....	285	April 20, 1840.....	do 9.....	228	April 14, 1841
March 24, 1841.....	Dec. 19, 1841.....	286	April 24, 1841.....	November 29.....	221	March 7, 1842
February 4, 1842.....	Nov. 28, 1842.....	308	April 20, 1842.....	do 28.....	222	May 6, 1843
April 13, 1843.....	Dec. 10, 1843.....	242	May 1, 1843.....	do 30.....	214	March 14, 1844
March 18, 1844.....	Dec. 17, 1844.....	278	April 18, 1844.....	do 26.....	232	March 3, 1845
February 24, 1845.....	Dec. 3, 1845.....	283	April 16, 1845.....	do 29.....	228	April 11, 1846
March 18, 1846.....	Dec. 14, 1846.....	275	April 16, 1846.....	do 25.....	224	April 23, 1847
April 7, 1847.....	Dec. 25, 1847.....	283	May 1, 1847.....	do 30.....	214	April 9, 1848
March 21, 1848.....	Dec. 27, 1848.....	292	May 1, 1848.....	December 9.....	223	March 25, 1849
March 19, 1849.....	Dec. 26, 1849.....	296	May 1, 1849.....	do 5.....	219	

, equeently, to and including 1861.

No.	1858.	1859.		1860.		1861.	
	Tons.	No.	Tons.	No.	Tons.	No.	Tons.
						1	300
	250	2	500	2	500	15	3,750
						5	1,200
						2	460
						12	2,700
				3	660	41	9,020
						5	1,050
	600	4	800	33	6,600	169	33,800
						1	195
						16	3,040
	1,260	12	2,160	60	10,800	36	6,480
						5	875
	2,250	7	1,190	17	2,890	3	510
						1	160
2	6,900	11	1,650	14	2,100	27	4,050
						1	145
	700	1	140	2	280	19	2,660
				2	270	1	135
	520	2	260	2	260	3	390
	1,875	1	125	5	625	8	1,000
	1,560	9	1,080	22	2,640	15	1,800
				5	575		
	330	1	110	4	440	5	550
		2	210			1	105
13	2,500	14	1,400	55	5,500	67	6,700
6	1,425	5	475	13	1,235	19	1,805
25	1,440	36	3,240	42	3,780	41	3,690
16	425	8	680	25	8,075		



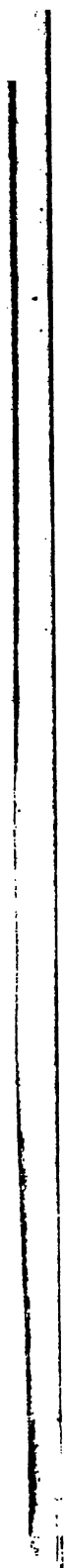
URES BETWEEN NUMBERS OF BRIDGES.

LOCATION OR NAME of openings.	CULVERTS.		Waste w'r, length of waste.	FEEDERS TO CANAL.	
	Stone or composite	Number & span of opening or arch.		Names.	Capacity, cu. ft. per min., dry season.
REPAIR SECT			Ft. in.		
Albany basin . . . . .					
Lock No. 1, Albany					
Water street, Alban					
Lawrence street, Al					
Weigh lock, Albany					
Ferry street, Albany			29		
Waste weir, section					
Culvert, Patroon cre	St. arch.	3 spans, 10, 11, 10			
Patroon . . . . .					
Culvert . . . . .	St. arch.				
Lock No. 2 . . . . .					
Culvert . . . . .	St. arch.				
Bull's Head . . . . .					
Culvert . . . . .	St. arch.				
Van Rensselaer's . .					
Culvert . . . . .	St. arch.				
Schuyler's . . . . .					
Culvert . . . . .	St. arch.				
Dunlop's . . . . .					
Culvert . . . . .	St. arch.	2 of 7 ft. 6 in . .			
Schuyler's . . . . .					
Culvert . . . . .	Stone . .				
Dennham's . . . . .					
Mansion street, Port					
Locks, Port Schuyler					
Side-cut . . . . .					
Albany and Troy . .					
U. S. Arsenal . . . .					
U. S. Arsenal . . . .					
Schenectady street,					
Culvert . . . . .	St. box .				
Ferry street, West T					
Canal street, West T					
Genesee street, West					
Locks, West Troy sid					
Side-cut . . . . .					
Union street, West T					
Auburn street, West					
Weigh lock, West Tr					
V. Y. Central R. R. .					
Champlain canal . .				Mohawk, thro' Champlain. }	6.570
Junction of Champla					
Lock No. 3, Junction					
Culvert and waste we	St. arch.		29 9		
Northern railroad . .					
Lock No. 4 . . . . .					
othou's . . . . .					
Lock No. 5 . . . . .					
Lock No. 6 . . . . .					
Culvert, Lansing cre	St. arch.	1 of 12 ft. . . . .			
Lock No. 7 . . . . .					
Lock No. 8 . . . . .					
Alexander's . . . . .					
Lock No. 9 . . . . .					
Culvert and waste we	St. arch.	1 of 8 ft. . . . .	13		
Lock No. 10 . . . . .					
Lock No. 11 . . . . .					
Lock No. 12 . . . . .					
Columbia street, Coh					
Lock No. 13 . . . . .					
Culvert . . . . .	St. arch.	1 of 8 ft. . . . .			

7

# N DIVISION.

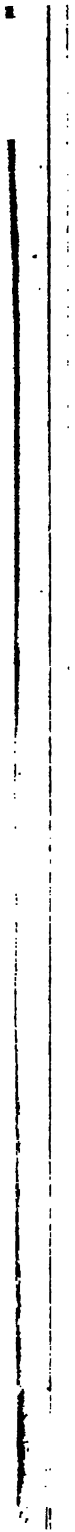
No. of bridges, E. to W.		STRUCTURES BETWEEN NUMBERS OF BRIDGES					
LOCATION OR NAME OF STRUCTURE		No. and span of openings.	CULVERTS.		Waste w <sup>r</sup> , length of waste.	FEEDERS TO CANAL.	
			Stone or composite	No. and span of opening or arch.		Names.	Capacity, cu. ft. per min., dry season.
					Ft. In.		
	Lock No. 14 .....						
	Lock No. 15 .....						
27	Harmony .....						
	Lock No. 16 .....						
	Lock No. 17 .....						
28	Abram Lansing's .....						
	Lock No. 18 .....						
29	Damon's .....						
	Waste weir .....				27 2		
30	Miller's (private) .....						
	Culvert .....	St. arch.	8 ft.				
31	A. B. F. Lansing's .....						
32	James Fonda's .....						
33	Abram Fonda's .....						
	Culvert .....	St. arch.					
34	Wheeler's .....						
	Aqueduct, Lower MS ft. 1 in .....						
REPAIR SECTION							
35	Crescent .....						
36	Furnace crescent, (P .....						
37	Hotaling's crescent, .....						
38	Freeman's crescent, .....						
39	J. DeVoe crescent, .....						
40	John White's .....						
41	Newton's .....						
42	Dunsback's .....						
	Culvert .....						
43	N. J. Clute's .....						
	Culvert .....	Comp'te	1 of 2 ft.				
44	N. J. Clute's .....						
45	Fowler .....						
46	James Pierce .....						
47	Widow Fort's .....						
48	John Clute .....						
49	John Pierce .....						
	Culvert .....	Comp'te					
50	Van Vranken .....						
51	Fellows' .....						
	Lock No. 19 .....						
52	Hegeman's .....						
	Culvert, Stony creek .....	St. arch.	1 of 10 ft. 6 in.				
53	Vischer's Ferry .....						
	Lock No. 20 .....						
	Waste weir .....				15 9		
54	Fonda's .....						
	Feeder, Rexford Flats .....					Mohawk feeder	10.979
	Lock No. 21 .....						
55	Rexford Flats .....						
	Lock No. 22 .....						
	Culvert for feeder .....	St. arch.					
	Aqueduct, Upper MS ft .....						
56	Aqueduct bridge .....						
57	Yedder's .....						
58	Cunningham's .....						
	Culvert .....	St. arch.	1 of 7 ft.				
59	Mohawk river .....						
60	Road bridge .....						
	Culvert, Simons kill .....	St. arch.	1				
61	Dry dock .....						
	Culvert .....	St. box.	1				
62	Jefferson street, Sch .....						
63	Green street, Schen .....						
64	N. Y. C. R. R., Sch .....						



# ERN DIVISION.

PICTURES BETWEEN NUMBERS OF BRIDGES.							
No. of bridges, E. to W.	LOCATION OR NAME of openings.	Stone or composite	CULVERTS.		Waste w'r, length of waste.	FEEDERS TO CANAL.	
			Number & span of opening or arch.			Names.	Capacity, cu. ft. per min., dry season.
					Ft. In		
65	Union street, Schene						
66	Liberty street, Sche						
67	State street, Schene						
	Culvert.....	St. arch.	1				
68	Church street, Schen						
69	Frog alley, Schenect						
	Waste weir, section				114		
	Culvert, section 30	St. arch.	1	of 6 ft.			
	Culvert, section 30	St. arch.	1				
70	Bradt's						
	Lock No. 23						
71	Van Patten's						
	Lock No. 24.....						
	Culvert.....	St. arch.	1	of 6 ft. 10 in.			
72	Becker's.....						
73	Van Slyck's.....						
	Aqueduct, Potters k		1	ft. 10 in			
74	Abram Bradt (privat						
	Culvert, section 34			1 of 7 ft.			
	Culvert, section 35			1 of 10 ft. 6 in.			
75	Thomas'						
76	Crawford						
77	Maybee's						
	Lock No. 25.....						
78	Clute's						
79	Veeder's.....						
80	Johnson's.....						
81	Kline.....						
	Culvert, section No.	Com'site	1	of 2 ft. 6 in.			
	Aqueduct, San Sai k		22	ft.			
82	Hoffman's Ferry.....						
	Culvert.....	St. arch.	1	of 4 ft.			
	Culvert.....	Com'site	1	of 1 ft. 6 in.			
	Culvert.....	St. arch.					
83	Swart (private).....						
84	J. Kline						
	Culvert, section 43.	St. arch.	1	of 10 ft.			
85	French's						
	Lock No. 26.....						
86	Phillips'						
	Lock No. 27.....						
	REPAIR SECT						
	Culvert.....	St. arch.	2	of 18 ft.			
	Culvert.....	St. arch.	1	of 7 ft.			
	Culvert.....	St. arch.	1	of 4 ft.			
87	Van Olinda's (privat						
	Waste weir and culv	St. arch.	1		15	8	
88	McDonald, Port Jack						
89	Bridge street, Port J						
	Culvert, Port Jackso	St. arch.	4	of 20 ft.			
	Culvert, Port Jackso	St. arch.	1	of 6 ft.			
	Culvert, Port Jackso	Com'site	1	of 3 ft.			
	Lock No. 28 (Yanke						
90	Wemple's (private).....						
91	John Ender's						
	Culvert, section 50						
	Feeder.....					Schoharie cr'ek	6.800
	Lock No. 29 (Empire						
92	P. J. Ender's						
93	Port Hunter						
	Lock No. 30.....						
	Aqueduct, Schoharie		39	ft. 9 in			
94	Willer's (private).....						

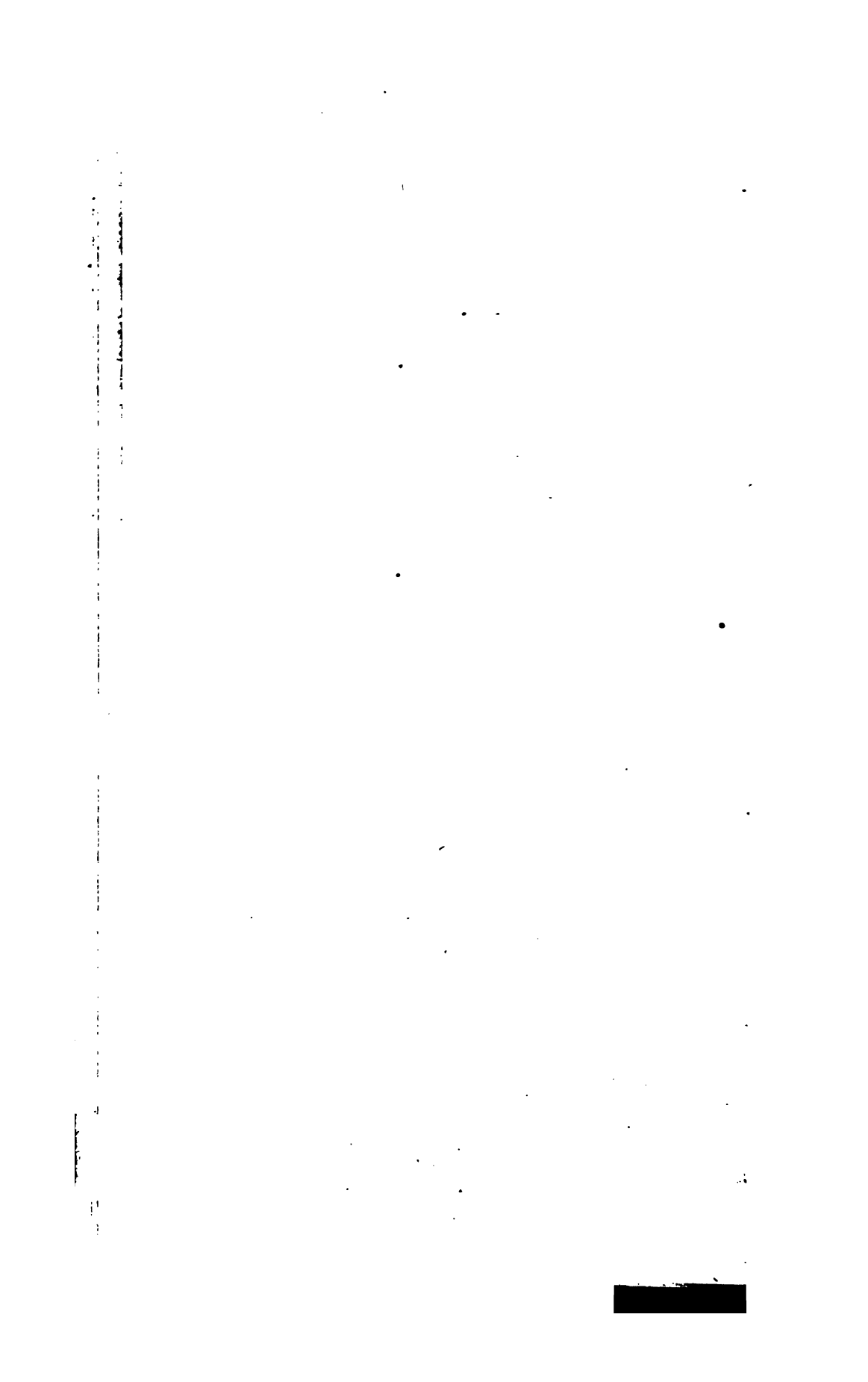




# RN DIVISION.

PICTURES BETWEEN NUMBERS OF BRIDGES.

LOCATION OR T	ber and span of openings.	CULVERTS.		Waste w'r, length of waste.	FEEDERS TO CANAL.	
		Stone or composite	No. and span of opening or arch.		Names.	Capacity, cu. ft. per min., dry season.
Hudson.....				Ft. in.		
Culvert, section						
Koon's.....		St. arch.	1 of 4 ft.....			
Culvert.....		St. arch.	2 of 10 ft.....			
Auricsville.....						
Culvert.....		St. arch.	4 of 22 ft.....			
Kassan's.....						
Putman's.....						
Montgomery co						
Vroman's.....						
Culvert.....		St. arch.	1 of 4 ft.....			
A. J. Yates (pri						
Franklin street,						
Culvert, Fulton		St. arch.	2.....			
Gardinier's (priv						
Main street, Ful						
Mohawk street,						
Culvert, Fulton		St. arch.	1 of 4 ft.....			
Snyder's.....						
Staring's.....						
Printup's.....						
Printup's aqued	ft. 10 in					
Culvert.....		St. arch.	1 of 4 ft.....			
A. J. Yates.....						
Culvert, section		St. arch.	1 of 4 ft.....			
Yates & Downin						
Yost's ferry.....						
Olstona aqueduc	ft. 8 in					
J. L. Yates.....	ft. 8 in					
Lasher's aquedu	ft. 8 in					
Lasher's bridge.						
Mitchell & Higg						
Culvert.....		St. arch.				
Waste weir.....						
Lock No. 31, Spi						
Geo. S. Spraker						
Spraker's aqued	ft. 10 in					
Ferry street, Spi						
Culvert.....		St. arch.	1 of 7 ft.....			
Van Evera's.....						
Kelley's.....						
Van Alstyne's..						
Vroman's.....						
Culvert.....		St. arch.	1 of 4 ft.....			
Dry dock, Cana						
Aqueduct, Cana	ft. 9 in					
Canal street, Ca						
Stafford & Clark						
Baell's (private)						
Culvert.....		Stone...				
Zimmerman's...						
Kittle's.....						
Culvert.....		Stone...				
Verplank's.....						
Lock No. 32....						
Chamberlain, Fo						
Aqueduct, Fort	ft					
Canal street, For						



# RN DIVISION.

## STRUCTURES BETWEEN NUMBERS OF BRIDGES.

LOCATION OR NAMES	Number and span of openings.	CULVERTS.		Waste w'r. length of waste.	FEEDERS TO CANAL.	
		Stone or composite	Number & span of opening or arch.		Names.	Capacity, cu. ft. per min., dry season.
3 River street, Fort Plain				Ft.		
4 Culvert.....		Stone..				
5 Clark's .....						
6 Bide's .....		St. arch.	1 of 12 ft. 6 in ..			
7 Culvert.....						
8 Cornelius (private) ..						
9 Waste weir .....				1 of 14		
10 Smith's .....						
11 Lock No. 33.....						
12 Powell's .....						
13 Culvert.....		Stone..				
14 Cox's, St. Johnsville						
15 Ferry .....						
16 Crouses' .....						
17 Feeder.....					Rocky rift.	10,602
REPAIR SECTION						
18 Lock No. 34.....						
19 Mindenville.....						
20 Burbee's.....						
21 Snell's.....						
22 Wheeler's .....						
23 Smith's .....						
24 Van Alstyne's .....						
25 Culvert.....		Stone..				
26 Sholl's .....						
27 Green's .....						
28 Lock No. 35.....						
29 Aqueduct, Castle creek	ft. 11 in					
30 Fox & Stanton .....						
31 Disfendorf .....						
32 Culvert.....		Stone..				
33 Schuyler's (private) ..						
34 Conner's .....						
35 Culverts .....		Stone..				
36 Waste weir and culv. ..		Stone..		14		
37 Fink's (private).....		Stone..				
38 Fink's .....						
39 Lock No. 36.....						
40 Waste weir.....						
41 Lock No. 37.....						
42 Lock No. 38 .....						
43 Feeder, Little Falls ..						
44 Ann street, Little Falls						
45 Feeder, Little Falls ..						
46 Lock No. 39, Little Falls						
47 Bellinger street, Little Falls						
48 Waste weir .....				69		
49 Sharp's (private).....						
50 Casler's.....						
51 Culvert, section No. 8 ..		Stone..				
52 John Casler's .....						
53 Culvert.....		Stone..				
54 Lock No. 40, Jackson						
55 Culvert.....		Stone..				
56 Waste weir.....						
57 Rankin's (private).....						
58 Miller's .....						
59 Snell's .....						
60 Culvert.....						
61 Staring's.....						



# N DIVISION.

## CTURES BETWEEN NUMBERS OF BRIDGES.

LOCATION OR NAME OF OPENINGS.	CULVERTS.		Waste w'r, length of waste.	FEEDERS TO CANAL.	
	Stone or composite	No. and span of opening or arch.		Names.	Capacity, cu. ft. per min., dry season.
Culvert .....	Stone...		Ft.In.		
Steele's.....					
Merrill's.....					
Lock No. 41, F.....					
Culvert .....	Stone...	Double arch....			
Waste weir.....			68		
Palmer's landin.....					
Ghirot's (privat.....					
Herkimer, lowe.....					
Chrisman's (pri.....					
Herkimer and.....					
Casler's (privat.....					
Canal street, M.....					
Lock No. 42, M.....					
Lock No. 43, M.....					
Aqueduct, Mof. 10 in.....					
Culvert .....	Stone...				
Myers & Spence.....					
Sterling.....					
Railroad street.....					
Feeder, Ilion.....				Steele's creek, Ilion.	} 800.
Aqueduct, Steeft. 10 in.....					
Steele & Roger.....					
Ilion and Frank.....					
Culvert .....	St. arch.	1 of 7 ft.....			
Lock No. 44.....					
Culvert .....	Stone...				
Burton & Richa.....					
Farmer & Ruse.....					
Judd, Frankfor.....					
Litchfield street.....					
Lock No. 45, F.....					
REPAIRS					
Aqueduct, Myeft. 10 in.....					
Road street, Fr.....					
Frank's.....					
Bridenbecker's.....					
Bridenbecker's.....					
Culvert, road tl.....	St. arch.	1 of 12 ft.....			
Bridenbecker's.....					
Hulsar's.....					
Starling's.....					
Culvert .....	St. box.	1 of 2 ft. x 2...			
Kast & Hulsar.....					
McKingsley.....					
Hulsar's.....					
Culvert. ....	St. arch.	1 of 4 ft.....			
Woodhull's (pri.....					
Four mile groce.....					
Culvert .....	St. box.	1 of 2 ft. 6 in.....			
Austin's (privat.....					
Hollow road.....					
Aqueduct, Fergft. 10 in.....					
Ferguson's road.....					
Culvert .....	St. arch.	1 of 4 ft.....			
Powell & Brink.....					
Green's.....					
Culvert, starch.....	St. arch.	1.....			
Starch factory.....					
Culvert .....	St. arch.	1 of 4 ft.....			

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# ERN DIVISION.

No. of bridges, E. to W.	LOCATION OR NAME OF STRUCTURE	Aqueducts, number and span of openings.	CULVERTS.		Waste w'r, length of waste.	FEEDERS TO CANAL.	
			Stone or composite	Number & span of opening or arch.		Names.	Capacity, cu. ft. per min., dry season.
202	Clay street, Utica .. Waste weir, Utica..				Ft. In. 62		
	Big Basin bridge, U						
203	Broad street, Utica.						
204	Catherine street, Ut						
205	First street, Utica..						
206	John street, Utica..						
	Weigh lock, Utica..						
207	Genesee street, Utica						
208	Hotel street, Utica .						
209	Seneca street, Utica						
210	Washington street, U						
211	Broadway street, Ut						
	Feeder, Utica .....					Chenango canal	750
212	Whitesboro' street, I						
213	Bruce street, Utica..						
	Culvert, Nail creek..		St. arch.	1 of 10 ft.			
	Lock No. 46 .....						
214	Schuyler street, Wes						
215	Jones' .....						
	Culvert .....		Com'site	1 of 2 x 2 .....			
216	Plankroad .....						
	Culvert .....		Com'site	1 of 2 x 2 .....			
	Culvert .....		Com'site	1 of 2 x 2 .....			
217	Yorkville road .....						
	Culvert, Tail race, O		St. arch.	2 of 10 ft.			
	Aqueduct, Sauquoit ..	22 ft.					
218	Clinton street, White						
219	Westmoreland street,						
220	Smiths' (private)...						
	Culvert, Whitesboro'		Com'site				
221	Willow street, White						
	Culvert .....		Com'site				
222	Plankroad .....						
223	Green's .....						
224	Chrisman's .....						
	Aqueduct, Oriskany ..	21 ft. 10 in					
225	Oriskany .....						
	Culvert, tail race, O.		St. arch.				
226	Brainard's .....						
227	Parker's .....						
228	Hennessey's .....						
	Culvert .....		Com'site	1 of 2 x 2 .....			
229	Darling's .....						
	Waste weir .....						
230	Taft's .....				98 6		
	Feeder .....					Butts' creek.	1,400
231	Newville .....						
	Culvert, Whittall cree		Com'site				
232	Poorhouse .....						
	Feeder .....					Moh'wk & Bl. R.	10,979
233	Bouck street, Rome ..						
234	N. Y. C. R. R., Rom						
	Feeder .....					Black Riv. can.	708
	Towpath bridge .....						
235	James street, Rome ..						
236	Washington street, R						
237	George street, Rome ..						
238	Jay street, Rome .....						
	Feeder .....					Wood creek.	125
	Tow path bridge and						
239	Doxtater avenue .....						



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# ERN DIVISION.

## STRUCTURES BETWEEN NUMBERS OF BRIDGES.

LOCATION OR NUMBER OF STRUCTURE.	Aqueduct, number and span of openings.	CULVERTS.		Waste w'r, length of waste.	FEEDERS TO CANAL.	
		Stone or composite	Number & span of opening or arch.		Names.	Capacity, cu. ft. per min., dry season.
Watertown & Reservoir				Ft. In.		
culvert		Com'site	1 of 2½ x 2½			
Fort Bull		Com'site	1 of 2½ x 2½			
Waste weir				98 6		
culvert, Fort Bull		St. arch.	1 of 8			
culvert east of H		St. arch.	1 of 4			
Lawley's						
culvert		Com'site	1 of 3 x 2½			
Ferrig.						
culvert, Stony road		St. arch.	1 of 12			
old towpath bridge						
culvert		St. arch.	1 of 4			
Little						
culvert		Com'site	1 of 2½ x 2½			
culvert		Com'site				
New London						
culvert		Com'site	1 of 2½ x 2½			
culvert		Com'site	1 of 2½ x 2½			
culvert		Com'site	1 of 2½ x 2½			
Castle						
Callin (private)						
Lewis (private)						
Culvert		Com'site	1 of 2½ x 2½			
Williams						
Culvert		Com'site	3 of 3 x 2½			
Lawton's						
Waste weir (berm)				69 3		
Culvert		Com'site	3 of 3 x 2½			
Onaida Lake dam						

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P. En  
MAN  
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Y. W.  
Z. W.  
J. W.

Hing  
Wai  
Sai  
Tan  
Tan

Free  
Fair  
Free  
Star  
Fox  
Bull

101  
50  
50  
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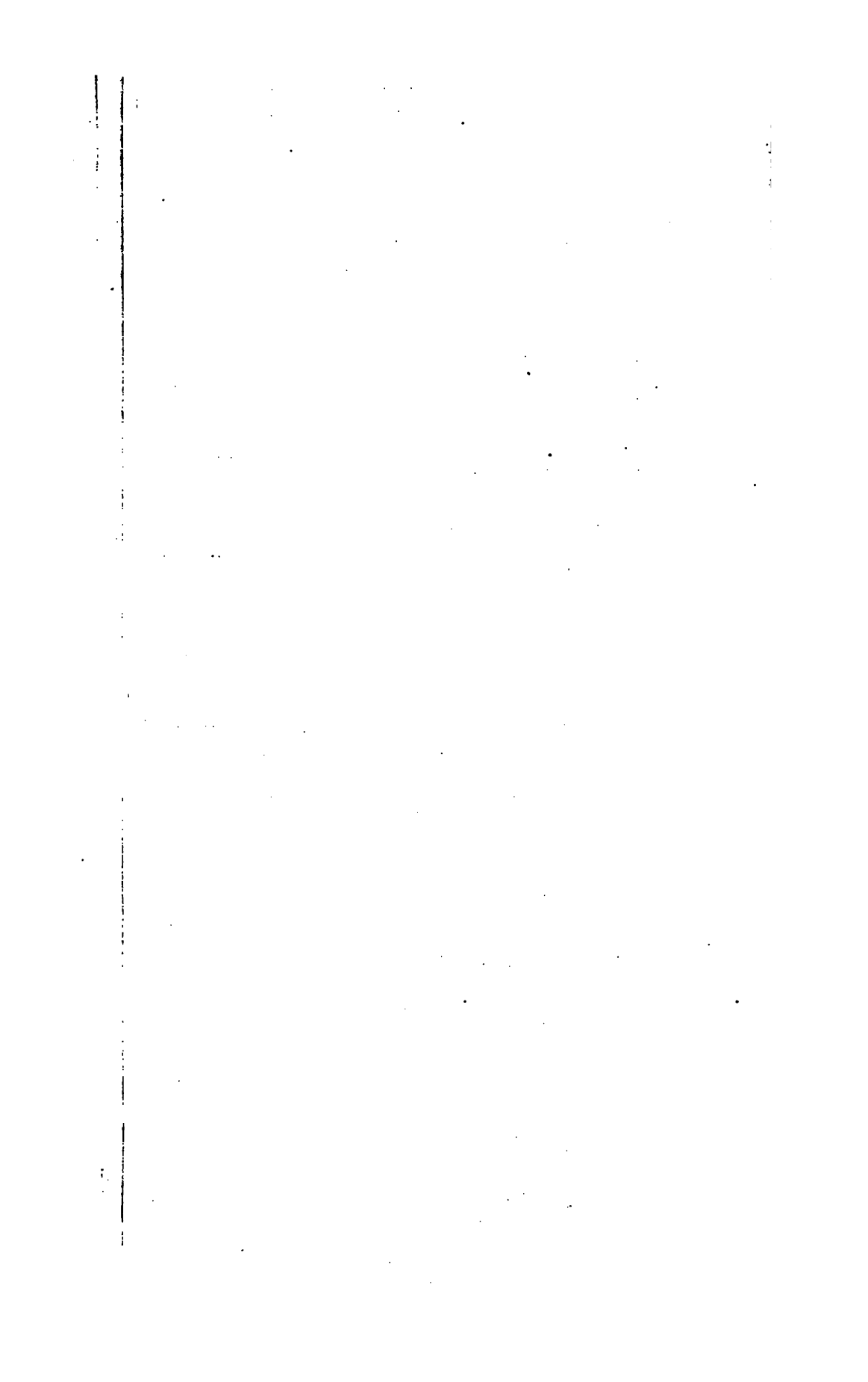
No. of bridge		gle.	No. and width of roadways.	Dimensions.	Remarks.
			Ft. In.	Ft.	
1....	Towing path....	L.	1 of 13 4	.....	Stone arch.
2....	Culvert under c.	A.	1 of 16 6	.....	Stone with
	Aqueduct road.	A.	1 of 16 6	.....	Cribs of timber and stone.
	Guard gates....				
	Wing dam....				
1....	Old lock....			15 x 90	Old Erie canal lock.
	P. Ender's road	A.	1 of 12 3	.....	Old Erie canal lock.
	Guard lock....			15 x 90	Old Erie canal lock.
2....	Or a guard lock.	A.	1 of 12	.....	Stone on timber foundation.
	Dam across cret				
1....	Towing path....	A.	1 of 15	.....	Over drop into canal.
	Culvert....			Box 2 x 2	Composite.
2....	Crouse's footro	A.	1 of 6	.....	Private on boats.
3....	Winne farm....	A.	1 of 11	.....	Private on boats.
4....	J. W. Hawn....	A.		Box 2 x 2	Composite.
	Culvert....				
5....	Winne farm....	A.	1 of 11	.....	Private.
6....	Hiram Snell fa	A.	1 of 11	.....	Private on boats.
7....	Wheeler's footr				
8....	Smiths' farm....	A.	1 of 11	.....	
9....	Van Alstyne's f	A.	1 of 11	.....	
10....	Van Alstyne's f				
11....	Shule's farm....	A.	1 of 11	.....	
12....	Green's farm....	A.	1 of 11	.....	
	Culvert under C			6 of 4 x 4	Stone box.
13....	Green's farm....	A.	1 of 11	.....	
14....	Staunton's farm	A.	1 of 11	.....	
15....	Fox's farm....	A.	1 of 11	.....	
	Bulkhead with				
	Stone dam, 360				9.87 feet above canal bottom.
1....	Tow path draw.				
2....	Stone aqueduct			47, 69, 46½	Segmental arch.
3....	Street bridge, d				
4....	Ann street, Hea	2.			
	Mill street....	2 of 11			
1....	Tow path bridge		1 of 16	.....	
2....	Road bridge, st				Versed line 6 feet.
	Bulkhead with				Top 9 feet above canal bottom.
	Stone dam on cu				



# E DIVISION.

## CTURES BETWEEN NUMBERS OF BRIDGES.

LOCATION OR NUMBER OF OPENINGS.	CULVERTS.		Waste w'r, length of wastement.	FEEDERS TO CANAL.	
	Stone or composite	No. and span of opening or arch.		Names.	Capacity, cu. ft. per min., dry season.
REPAIR SEC			Ft. in.		
Oneida Lake canal					
Section No. 135.	Com'site	1 of 3 ft.			
Stark's					
Section No. 135.	Com'site	1 of 3 ft.			
Dunbarton					
Section No. 136.	Com'site	1 of 3 ft.			
Section No. 136.	St. box.	1 of 2 ft.			
Loomis'					
Section No. 137.	St. box.	1 of 2 ft.			
State bridge.					
Section No. 137.	Com'site	1 of 3 ft.			
Section No. 137.	St. arch.	1 of 4 ft.			
Section No. 137.	St. arch.	1 of 4 ft.			
Brundy brook	St. arch.	1 of 12 ft.			
Durhamville					
Section No. 139.	St. arch.	1 of 4 ft.			
Durhamville					
Oneida creek	St. arch.	2 of 26 ft.			
Oneida creek			temp.		
Durhamville					
Cowassillon	Com'site	10 of 4 ft.		Oneida.	13.50
Section No. 141			100		
Cowassillon				Cowassillon c'k	Not det.
Lenox basin					
Section No. 144	Com'site	2 of 3 ft.			
Peterborough stree					
Section No. 145	St. arch.	2 of 8 ft.			
Main street, Canas					
Section No. 146	Com'site	1 of 3 ft.			
Bruce bridge.					
Beebee's bridge.					
Section No. 147	Com'site	3 of 3 ft.			
Owlville					
Section No. 148	Com'site	3 of 3 ft.			
Town line					
New Boston					
Canascraga					
Canascraga	Com'site	10 of 4 ft.			
Chittenango.				Chit'nango c'k	{ *30.35 +23.51 }
Chittenango.					
Chittenango creek					
Bolivar					
Section No. 152	St. arch.	1 of 5 ft.			
West of Bolivar					
Pool's brook.					
Kirkville					
Section No. 155	St. arch.	1 of 3 ft.			
Manlius Center.					
Rotwonis					
REPAIR SEC					
Limestone creek.				Limestone c'k.	500
Limestone feeder.					
Limestone creek.					
Pratt's landing.					
Butternut creek.					
Butternut creek.				Orville.	500
Orville feeder					
Thompson's					
Lodi, No. 47					
Lodi street, Syracu					
Lodi, No. 48					
William street, Syt					



# DIVISION.

## URES BETWEEN NUMBERS OF BRIDGES.

LOCATION OR NAME OF OPENINGS.	CULVERTS.		Waste w <sup>r</sup> , length of wastement.	FEEDERS TO CANAL.	
	Stone or composite	Number & span of opening or arch.		Names.	Capacity, cu. ft. per min., dry season.
Syracuse, No. 49 .....			Ft.		
leBride street, Syrac					
ock street, Syracuse					
ast towing path .....					
est towing path .....					
arren street, Syracu					
alina street, Syracu					
linton street, Syracu					
runklin street, Syrac					
ondaga creek .....	St. arch.	3 of 22 ft.			
est street, Syracuse					
. R. basin .....			100		
eddes street, Syracu					
ection No. 170 .....	St. arch.	1 of 3 ft.			
enesee street, Gedds					
alina road .....					
ection No. 173 .....	St. arch.	1 of 3 ft.			
ake road .....					
ection No. 173 .....	St. arch.	1 of 3 ft.			
ast of lock 50 .....					
ection No. 175 .....	St. arch.	2 of 4 ft.			
REPAIR SECTION					
ift lock No. 50 .....					
ere's .....					
elbisk .....					
ection No. 177 .....	St. arch.	1 of 3 ft.			
ambo .....					
ine Mile creek .....	Com'site				
ection No. 179 .....	Com'site	1 of 3½ ft.			
ine Mile creek .....				Camillus.	Not det.
amillus Landing .....					
ewport .....					
anton .....					
ulvert .....	Com'site	1 of 3 ft.			
eru .....					
feeder .....				Carpenter br'k.	Not det.
Carpenter brook .....					
Carpenter brook .....	Com'site	3 of 4 ft.			
Carpenter brook .....			80		
Carpenter culvert .....	Com'site	1 of 3½ ft.			
ordan, East .....					
kancateles creek .....	Com'site			Jordan.	Not det.
feeder .....					
lain street, Jordan					
aggett's .....					
ock No. 51 .....					
ection No. 189 .....	St. arch.	1 of 6 ft.			
old Spring .....					
ennett's .....					
ulvert .....	Com'site	1 of 3 ft.			
ill's .....					
ulvert .....	St. arch.	1 of 4 ft.			
ulvert .....	Com'site	2 of 3 ft.			
t. John's .....					
oung's .....					
ulvert .....	Com'site	1 of 4 ft.			
aste weir .....			40		
iles' .....					
ection No. 193 .....	Com'site	1 of 3 ft.			
lain street, Weedsport					
ection No. 193 .....	Com'site	1 of 3 ft.			
amilton .....					
enterport .....	Com'site	1 of 3 ft.			



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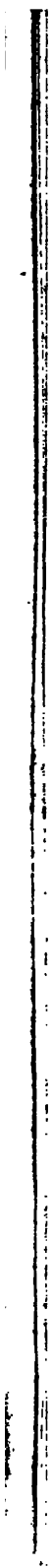
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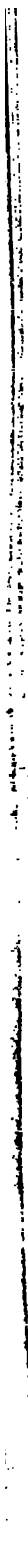
## TURES BETWEEN NUMBERS OF BRIDGES.

LOCATION OR NAME OF OPENINGS. TUNNELS.	CULVERTS.		Waste w'r, length of wastement.	FEEDERS TO CANAL.	
	Stone or composite	No. and span of opening or arch.		Names.	Capacity, cu. ft. per min., dry season.
			Ft In.		
terport.....					
tion 196.....	Com'site	2 of 3 ft.....			
tion 197.....	St. arch.	1 of 6 ft.....			
as street, Port Byron.....					
asco street, Port Byron.....					
n street, Port Byron.....					
t Byron aqueduct.....	Com'site				
al street, Port Byron.....					
Byron, lock 52.....					
ion No. 198.....					
ion No. 200, culvert.....	Com'site	1 of 4 ft.....			
ion No. 200.....					
n Brook aqueduct.....					
p's b'dg.....					
ion 201, culvert.....	St. arch.	1 of 4 ft.....			
i street, Montezuma.....					
street, Montezuma.....					
ion 201, culvert.....	St. arch.	1 of 4 ft.....			
r's bridge.....					
ca river aqueduct.....					
Point.....					
ion 204, culvert.....	Com'site	2 of 3 ft.....			
ion 206, culvert.....	do	2 of 3 ft.....			



# N DIVISION.

No. of bridges, E. to W.	LOCATION OR NAMES TUNNELS	of openings.	DISTANCES BETWEEN NUMBERS OF BRIDGES.				
			CULVERTS.		Waste w'r, length of wastement.	FEEDERS TO CANAL.	
			Stone or composite	Number & span of opening or arch.		Names.	Capacity, cu. ft. per min., dry season.
1	Road bridge in Wayne						
	East line section 207						
	2 culverts, section 207		Com'site	3			
2	Pit lock bridge, section 2						
	Box culvert, section 2		Stone	3			
	2 arch culverts, section 2		do	4 & 6 chord			
3	Waldruff's bridge, section 2						
4	N. Y. Central R. R.						
	Arch culvert, section 2		Stone	6 chord			
	Arch culvert, section 2		do				
5	Glasgow street, Clyde						
	Arch culvert, section 2		Stone				
6	Sodus street bridge, Clyde						
	Waste weir, section 2						
	Double arch culvert, section 2		Stone				
	Clyde, lock No. 56, section 2						
7	Adams' bridge, section 2						
8	Adams' bridge, section 2						
9	Adams' bridge, section 2						
	Culvert, section 215		Com'site	4			
	Waste weir (5 openings), section 2						
	Culvert, section 216		Com'site	2			
10	Lock Berlin bridge, section 2						
	Berlin lock No. 57						
11	Bridge on section 217						
12	Goetzman's bridge, section 2						
13	Coles' bridge, section 2						
14	McDonald's bridge, section 2						
15	Teachout's bridge, section 2						
	Waste weir, section 2						
	Culvert (arch), section 2		Stone	10 chord			
16	Geneva street, Lyons						
17	Church street, Lyons						
18	Water street, Lyons						
	Lyons, lock No. 58						
19	Leach's, section 225						
	Mud creek aqueduct, section 2						
	Culvert, section 225		Com'site	2 of 3 ft.			
20	Coles' bridge, section 2						
21	Coles' bridge, section 2						
	Culvert, section 226		Com'site				
	Poorhouse, lock No. 59						
	Culvert, section 227						
22	Morse's bridge, section 2						
	Culvert, section 228		Stone	6 chord			
23	N. Y. Central R. R.						
24	Farm and change, section 2		Stone	4 chord			
	Culvert, section 229						
	Lower Lockville, lock						
25	Lockville bridge, section 2						
	Middle Lockville, lock						
	Upper Lockville, lock						
26	Charles-st. bridge, N.						
27	Vienna-st. bridge, N.						
	Waste weir, section 2						
	Arch culvert, section 2		Stone	8 chord			
28	Allerton's bridge, section 2						
29	O'Rourke's bridge, section 2						
30	Swezey's bridge, section 2						
	Arch culvert, section 2		Stone	6 chord			
31	Palmer's bridge, section 2						
32	Port Gibson bridge, section 2						
33	Galloway's bridge, section 2						
	Arch culvert, section 2		Stone	6 chord			

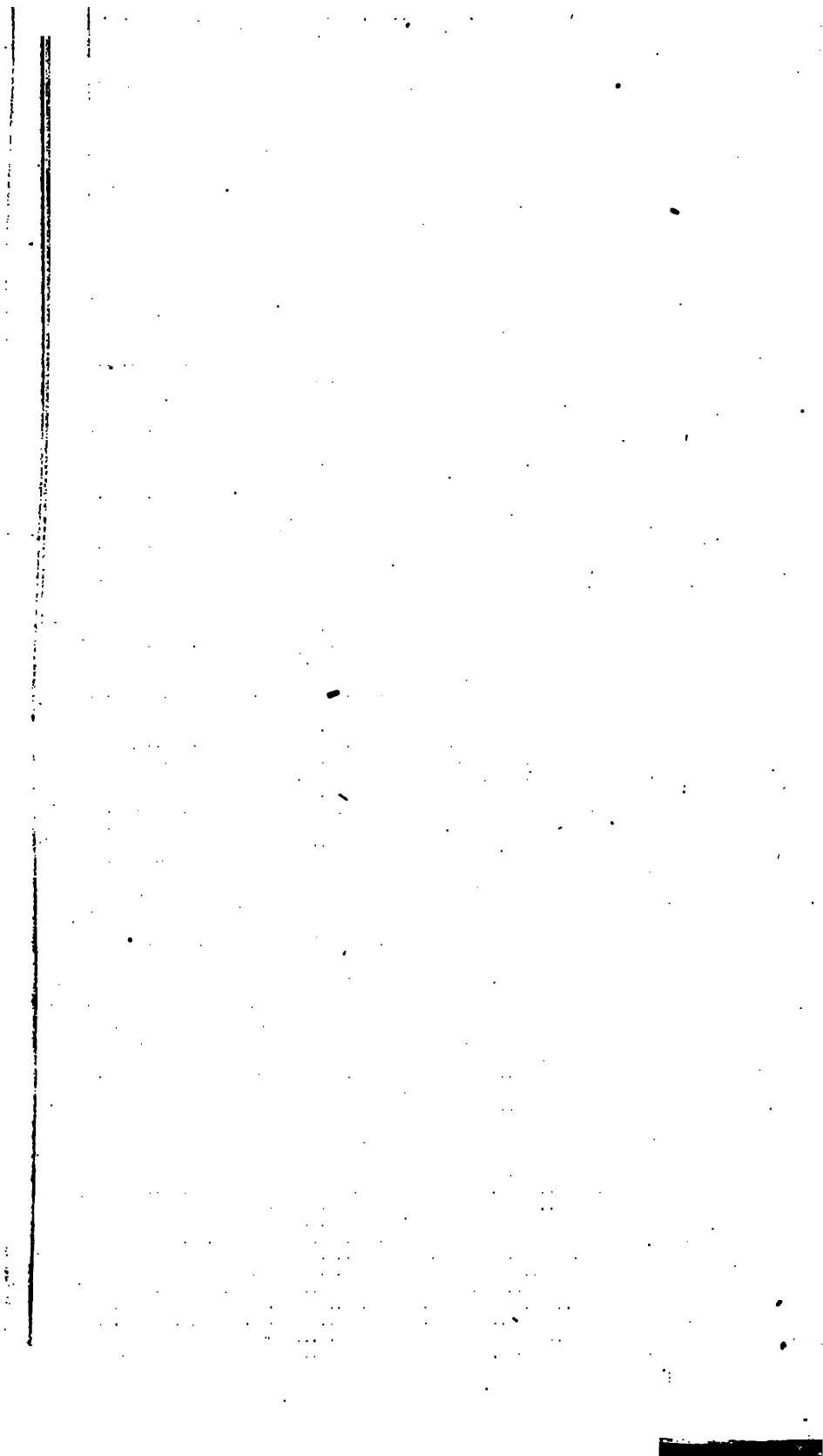


# ERN DIVISION.

## STRUCTURES BETWEEN NUMBERS OF BRIDGES.

No. of bridges, E. to W.	LOCATION OR STRUCTURE, number and span of openings.	CULVERTS.		Waste w't, length of waste.	FEEDERS TO CANAL.	
		Stone or composite	Number & span of opening or arch.		Names.	Capacity, cu. ft. per min., dry season.
	Arch culvert, s. East road, Pal.	Stone...	12 chord	Ft.		
34	R. R. avenue,					
35	Arch culvert, s. Market street,	Stone...	6 chord			
36	Church street					
37	Farm and chan					
38	Mud creek aqu					
39	Crandall's brid					
40	Spears' bridge					
41	White's bridge					
42	Lower Macedon					
42	Road and chan					
	Culvert, section	Com'site	2 of 3			
	Double lock, N					
43	Macedon bridg					
	Discharge culv	Wood...				
44	Freyers' bridge					
45	Wayneport bri					
46	Knappville bri					
	Thomas creek	Com'site	4			
47	Baker's bridge					
48	Parker's bridge					
	Waste weir at			61		
49	Main street bri					
50	Fulham's bridg					
	Culvert, section	Com'site	2 of 2			
	Arch, section 2	Stone...	4 chord			
51	Wapping bridg					
52	Weltsie's bridg					
	Stop gate, 40 f					
	Arch culvert, s	Stone...	6 chord			
53	Bushnell's basi					
	Irondequoit crt	Stone...	23 chord		118	
54	Cartersville br					
	Stop gate, 40 f					
	Waste weir, se			69		
55	N. Y. Central					
	Culvert, section	Com'site	2 openings			
56	Pittsford bridg					
	Culvert, section	Com'site	2 of 2			
57	Pittsford bridg					
58	Pittsford bridg					
	Arch culvert, s	Stone...	12 chord			
	Arch culvert, s	Stone...	4 chord			
59	Cook's bridge,					
	Pittsford, lock					
60	Springhouse br					
	Arch culvert, s	Stone...	4 chord			
61	Rowland's brid					
	Allen's creek c	Stone...	12 chord			
	Berne waste w			20		
62	Donelley's brid					
	Culvert, section	Com'site	2 openings			
	Culvert, section	Com'site	2 openings		65	
63	Drake bridge,					
	Arch culvert, s	Stone...	4 chord			
	Miller's, Lock					
64	Brighton bridg					
	Lock No. 37, s					
	Reservoir lock,					
	Berne waste w			15		
65	Culver bridge,					
66	Monroe street					

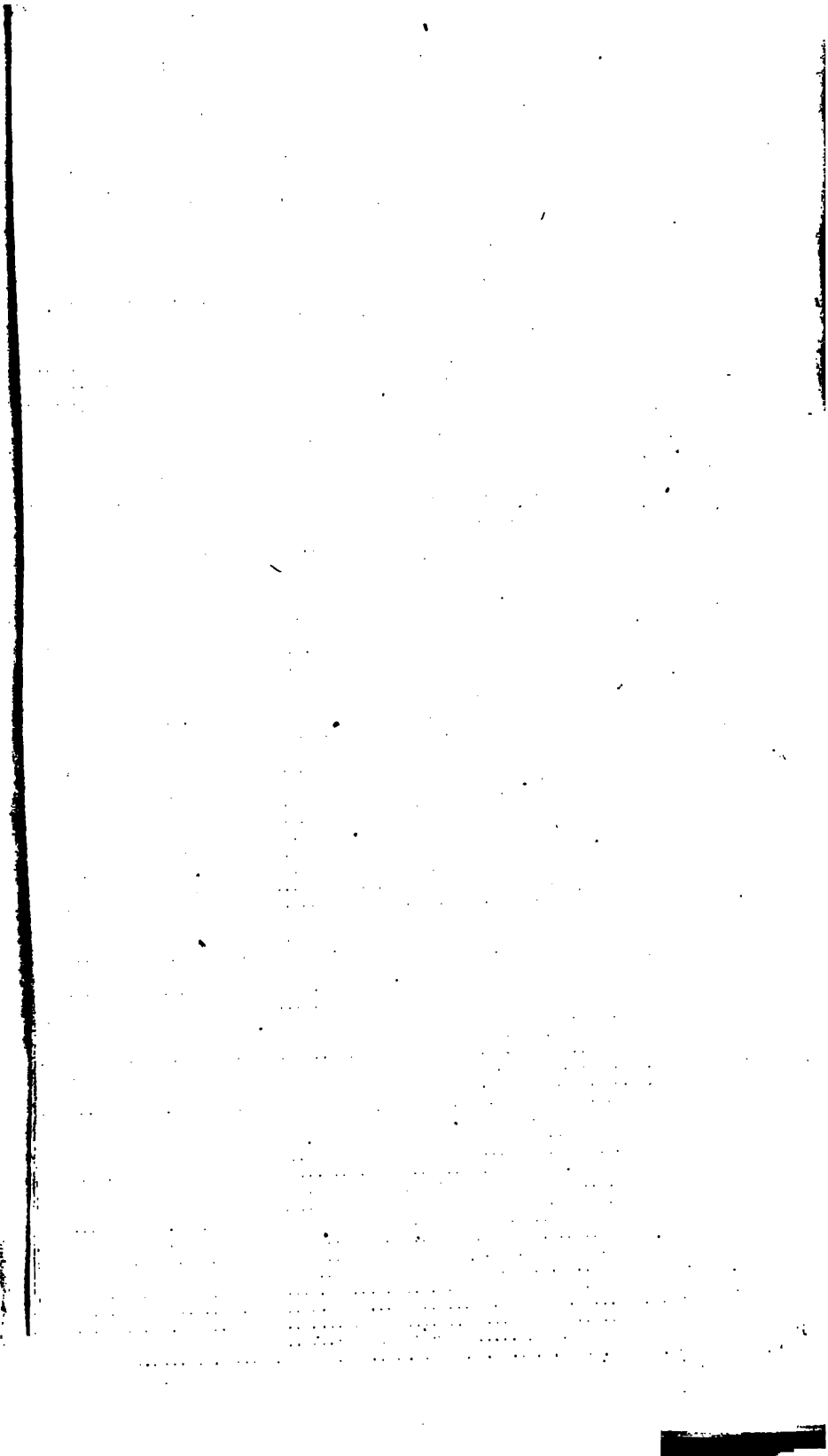
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## RN DIVISION.

No. of bridges, E. to W.	LOCATION OR NAMES	Number and span of openings.	CULVERTS.		Waste w'r., length of waste.	FEEDERS TO CANAL.	
			Stone or composite	No. and span of opening or arch.		Names.	Capacity, cu. ft. per min., dry season.
	Lock No. 69.....				Ft.		
67	Nelson-st., Rochester.....						
68	Alexander-st., Roch <sup>r</sup> .....						
69	St. Paul-st., Rochester.....						
	Box culvert, section 1.....	Stone...					
	Genesee river feeder.....					Genesee river.	
	Waste weir, section 2.....						
	Weigh lock, section 2.....				60		
70	Change bridge, section.....						
71	Court street bridge, section.....						
	Stone aqueduct, 9 arches.....	Stone...					
72	T. P. bridge on Childs.....						
73	Berne foot bridge, section.....						
74	Exchange-st. br., Rochester.....						
75	Fitzhugh-st. br., Rochester.....						
76	Sophia-st. br., Rochester.....						
77	Washington-st. br., Rochester.....						
78	High street br., Rochester.....						
79	Buffalo street br., Rochester.....						
80	Ford street br., Rochester.....						
81	T. P. bridge over Genesee Valley canal.....					{ Genesee Valley canal. }	
82	N. Y. C. R. R., Rochester.....						
83	N. Y. C. R. R., Rochester.....						
84	Allen-st. br., Rochester.....						
85	Brown-st. br., Rochester.....						
86	Jay street br., Rochester.....						
87	Smith street br., Rochester.....						
88	N. Y. C. R. R. to N.....						
89	Lyell street br., Rochester.....						
	Stop gate, 40 feet long.....						
	Arch culvert, section 1.....	Stone...	10 chord				
	Box culvert, section 2.....	do					
90	N. Y. C. R. R. to Ch.....						
91	Farm and change bridge.....						
	Arch culvert, section.....	Stone...	4 chord				
92	Scott's bridge, section.....						
	Arch culvert.....	Stone...	4 chord				
93	Four mile grocery bridge.....						
94	Rapalve's bridge.....						
95	Shuart's bridge.....						
	Arch culvert.....	Stone...	7½ chord				
	Arch culvert.....	do	4 chord				
96	Grey's bridge.....						
	Arch culvert.....	Stone...	4 chord				
97	Finley's bridge.....						
98	Eight mile grocery bridge.....						
99	Cromwell's bridge.....						
	Arch culvert.....	Stone...	4 chord				
100	Hiscock's bridge.....						
101	Norman's bridge.....						
	Old surface berme spillway.....				30		
	Berne waste weir.....				6		
	Arch culvert.....	Stone...	12 chord				
102	Spencerport bridge.....						
	Culvert.....	Composite					
	Arch culvert.....	Stone...	4 chord				
	Arch culvert.....	do	4 chord				
103	Webster's, east bridge.....						
	Arch culvert.....	Stone...	4 chord				





# DIVISION.

No. of bridges, E. to W.	LOCATION OR NAME TURES.	DISTANCES BETWEEN NUMBERS OF BRIDGES.				
		CULVERTS.		Waste w <sup>r</sup> , length of waste.	FEEDERS TO CANAL.	
		Stone or composite	Number & span of opening or arch.		Names.	Capacity, cu. ft. per min., dry season.
				Ft.		
104	Webster's, west bridge					
105	Cressey's bridge					
	Arch culvert	Stone	6 chord			
	Arch culvert	Stone	6 chord			
106	Adams' basin bridge					
	Combined culvert and	Doub.ar.		29		
107	Doty's bridge	12 chord				
	Culvert	Com'site	2 openings			
108	Chapin's bridge					
109	Cooley basin bridge					
	Culvert	Com'site	2 openings			
	Arch culvert	Stone	4 chord			
	Box culvert	Stone	3½ chord			
110	Brockport bridge					
111	Brockport, Main street					
	T. P. waste weir, sectt			54		
	Culvert 1, west of wa	Wood	4 x 1			
	Culvert 2, west of wa	Com'site	3 x 3			
112	Danforth bridge					
	Culvert	Arch	6 ft.			
	Culvert	Com'site				
	Culvert	Com'site	4 ft.			
113	Miner's bridge					
114	County line bridge					
	Arch culvert	Stone	6 ft.			
	Arch culvert	Stone	4 ft.			
	Stop gate					
115	Salisbury's bridge					
	Berne waste weir			18		
	Box culvert (old canal)	Wood				
	Arch culvert (old canal)	Stone	11 ft.			
	Waste weir (old canal)			68		
116	Frisbie's bridge (old ca					
	Arch culvert	Stone	18 ft.			
117	Road bridge					
	Arch culvert	Stone	4 ft.			
118	McCarty's bridge					
	Arch culvert	Stone	4 ft.			
	Arch culvert	Stone	4 ft.			
119	Tuttle's bridge					
	Stop gate					
120	Carleton's bridge					
	Arch culvert	Stone	10 ft.			
121	Hulberton bridge					
	Culvert	Stone	4 ft.			
	Culvert and waste weir	Stone, 2	12 ft.	24		
122	Brockville bridge					
123	Hindsburgh bridge					
	Arch culvert	Stone	6 ft.			
124	Transit bridge					
	Arch culvert	Stone	4 ft.			
125	Jaqueth's bridge					
	Arch culvert	Stone	4 ft.			
126	Bidwell's bridge					
	Box culvert	Stone	2 x 4			
127	Brailley's bridge					
	Arch culvert	Stone	4 ft.			
128	Hall's bridge					
	Culvert and waste weir	Stone, 2	12 ft.	92		
	Box culvert	Stone				
129	Ingersoll street bridge					
130	Batavia street bridge					
	Culvert	Com'site				

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# RN DIVISION.

## STRUCTURES BETWEEN NUMBERS OF BRIDGES.

LOCATION OR Aqueeduct, num- ber and span of openings.	CULVERTS.		Waste w'r. length of waste.	FEEDERS TO CANAL.	
	Stone or composite	Number & span of opening or arch.		Names.	Capacity, cu. ft. per min., dry season.
Arch culvert, s. . . . .	Stone...	12 chord . . . . .	Ft.		
East road, Falk . . . . .					
R. R. avenue, . . . . .					
Arch culvert, s. . . . .	Stone...	6 chord . . . . .			
Market street, . . . . .					
Church street, . . . . .					
Farm and chan . . . . .					
Mud creek aqu . . . . .					
Crandall's brid . . . . .					
Spears' bridge, . . . . .					
White's bridge . . . . .					
Lower Macedon . . . . .					
Road and chan . . . . .					
Culvert, section . . . . .	Com'site	2 of 3 . . . . .			
Double lock, N . . . . .					
Macedon bridg . . . . .					
Discharge culv . . . . .	Wood...				
Freyers' bridge . . . . .					
Wayneport brid . . . . .					
Knappville bri . . . . .					
Thomas creek . . . . .	Com'site	4 . . . . .			
Baker's bridge . . . . .					
Parker's bridge . . . . .					
Waste weir at . . . . .			61		
Main street bri . . . . .					
Fulham's bridg . . . . .					
Culvert, section . . . . .	Com'site	2 of 2 . . . . .			
Arch, section 2 . . . . .	Stone...	4 chord . . . . .			
Wapping bridg . . . . .					
Walsie's bridg . . . . .					
Stop gate, 40 f . . . . .					
Arch culvert, s . . . . .	Stone...	6 chord . . . . .			
Bushnell's bas . . . . .					
Irondequoit cr . . . . .	Stone...	23 chord . . . . .			
Cartersville br . . . . .					
Stop gate, 40 f . . . . .					
Waste weir, se . . . . .			69		
N. Y. Central . . . . .					
Culvert, section . . . . .	Com'site	2 openings . . . . .			
Pittsford bridg . . . . .					
Culvert, section . . . . .	Com'site	2 of 2 . . . . .			
Pittsford bridg . . . . .					
Pittsford bridg . . . . .					
Arch culvert, s . . . . .	Stone...	12 chord . . . . .			
Arch culvert, s . . . . .	Stone...	4 chord . . . . .			
Cook's bridge, . . . . .					
Pittsford, lock . . . . .					
Springhouse br . . . . .					
Arch culvert, s . . . . .	Stone...	4 chord . . . . .			
Rowland's brid . . . . .					
Allen's creek c . . . . .	Stone...	12 chord . . . . .			
Berne waste w . . . . .			20		
Donelley's brid . . . . .					
Culvert, section . . . . .	Com'site	2 openings . . . . .			
Culvert, section . . . . .	Com'site	2 openings . . . . .			
Drake bridge, . . . . .					
Arch culvert, s . . . . .	Stone...	4 chord . . . . .			
Miller's, Lock . . . . .					
Brighton bridg . . . . .					
Lock No. 37, s . . . . .	Stone...				
Reservoir lock . . . . .					
Berne waste w . . . . .			15		
Culver bridge, . . . . .					
Monroe street . . . . .					

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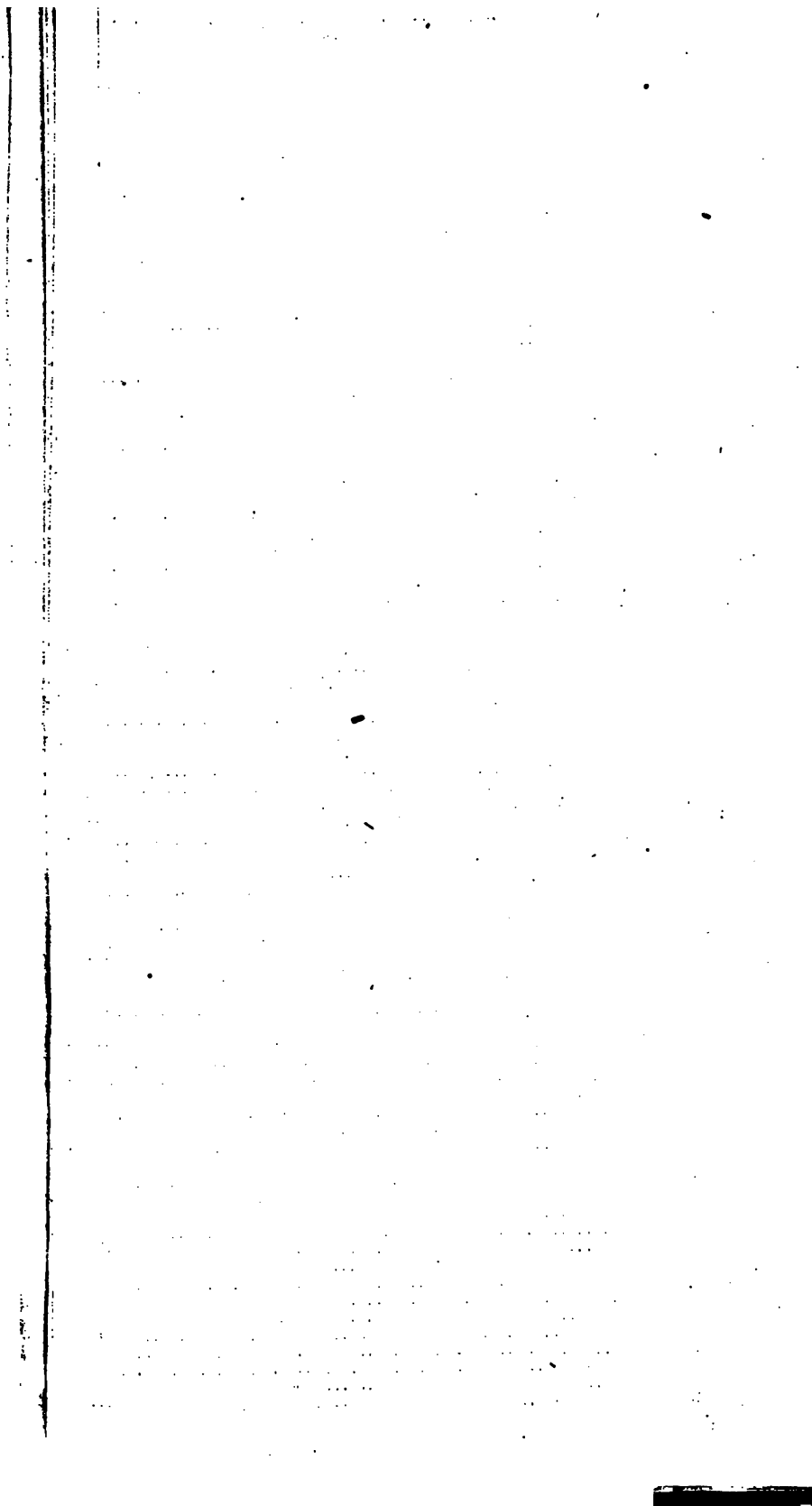
## UCTURES BETWEEN NUMBERS OF BRIDGES.

LOCATION OR Aqueduct, number and span of openings.	CULVERTS.		Waste w'r, length of waste.	FEEDERS TO CANAL.	
	Stone or composite	Number & span of opening or arch.		Names.	Capacity, cu. ft. per min., dry season.
Arch culvert, s. East road, Pal. R. R. avenue.	Stone...	12 chord	Ft.		
Arch culvert, s. Market street.	Stone...	6 chord			
Church street b. Farm and chan.					
Mud creek aqu.					
Crandall's brid.					
Spears' bridge.					
White's bridge.					
Lower Macedon Road and chan.					
Culvert, section.	Com'site	2 of 3			
Double lock, N. Macedon bridge.					
Discharge culv.	Wood...				
Freyers' bridge.					
Wayneport bri.					
Knappville bri.					
Thomas creek.	Com'site	4			
Baker's bridge.					
Parker's bridge.					
Waste weir at Main street bri.			61		
Fulham's bridge.					
Culvert, section.	Com'site	2 of 2			
Arch, section 2.	Stone...	4 chord			
Wapping bridge.					
Weltsie's bridge.					
Stop gate, 40 f.					
Arch culvert, s.	Stone...	6 chord			
Bushnell's basi.					
Irondequoit cr.	Stone...	23 chord			
Cartersville br.					
Stop gate, 40 f.					
Waste weir, se.			69		
N. Y. Central					
Culvert, section.	Com'site	2 openings			
Pittsford bridge.					
Culvert, section.	Com'site	2 of 2			
Pittsford bridge.					
Pittsford bridge.					
Arch culvert, s.	Stone...	12 chord			
Arch culvert, s.	Stone...	4 chord			
Cook's bridge.					
Pittsford, lock.	Com'site				
Springhouse br.					
Arch culvert, s.	Stone...	4 chord			
Rowland's brid.					
Allen's creek o.	Stone...	12 chord			
Berne waste w.			20		
Donelley's brid.					
Culvert, section.	Com'site	2 openings			
Culvert, section.	Com'site	2 openings			
Drake bridge.					
Arch culvert, s.	Stone...	4 chord			
Miller's, Lock.					
Brighton bridge.					
Lock No. 37, se.					
Reservoir lock.					
Berne waste w.			15		
Culver bridge.					
Monroe street.					

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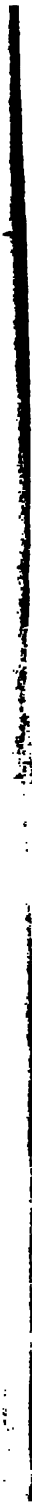
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## RN DIVISION.

		RELATIONS BETWEEN NUMBERS OF BRIDGES.					
No. of bridges, E. to W.	LOCATION OR NAMES	No. and span of openings.	CULVERTS.		Waste w't, length of waste.	FEEDERS TO CANAL.	
			Stone or composite	No. and span of opening or arch.		Names.	Capacity, cu. ft. per min., dry season.
	Lock No. 69.....				Ft.		
67	Nelson-st., Rochester.....						
68	Alexander-st., Rochester.....						
69	St. Paul-st., Rochester.....						
	Box culvert, section 2.....	Stone...					
	Genesee river feeder.....					Genesee river.	
	Waste weir, section 2.....						
	Weigh lock, section 2.....				60		
70	Change bridge, section.....						
71	Court street bridge, section.....						
	Stone aqueduct, 9 arch.....						
72	T. P. bridge on Childs.....						
73	Berne foot bridge, section.....						
74	Exchange-st. br., Rochester.....						
75	Fitzhugh-st. br., Rochester.....						
76	Sophia-st. br., Rochester.....						
77	Washington-st. br., Rochester.....						
78	High street br., Rochester.....						
79	Buffalo street br., Rochester.....						
80	Ford street br., Rochester.....						
81	T. P. bridge over Genesee Valley canal.....					{ Genesee Valley canal. }	
82	N. Y. C. R. R., Rochester.....						
83	N. Y. C. R. R., Rochester.....						
84	Allen-st. br., Rochester.....						
85	Brown-st. br., Rochester.....						
86	Jay street br., Rochester.....						
87	Smith street br., Rochester.....						
88	N. Y. C. R. R. to N. Y. C. R. R. bridge.....						
89	Lyell street br., Rochester.....						
	Stop gate, 40 feet long.....						
	Arch culvert, section 1.....	Stone...	10 chord.				
	Box culvert, section 2.....	do					
90	N. Y. C. R. R. to Chateaufort.....						
91	Farm and change bridge.....						
	Arch culvert, section 1.....	Stone...	4 chord.				
92	Scott's bridge, section 1.....						
	Arch culvert.....	Stone...	4 chord.				
93	Four mile grocery bridge.....						
94	Rapalye's bridge.....						
95	Shuart's bridge.....						
	Arch culvert.....	Stone...	7½ chord.				
	Arch culvert.....	do	4 chord.				
96	Grey's bridge.....						
	Arch culvert.....	Stone...	4 chord.				
97	Finley's bridge.....						
98	Eight mile grocery bridge.....						
99	Cromwell's bridge.....						
	Arch culvert.....	Stone...	4 chord.				
100	Hiscocks bridge.....						
101	Norman's bridge.....						
	Old surface berme spillway.....				30		
	Berne waste weir.....				6		
	Arch culvert.....	Stone...	12 chord.				
102	Spencerport bridge.....						
	Culvert.....	Com'site					
	Arch culvert.....	Stone...	4 chord.				
	Arch culvert.....	do	4 chord.				
103	Webster's, east bridge.....						
	Arch culvert.....	Stone...	4 chord.				





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## RELATIONS BETWEEN NUMBERS OF BRIDGES.

LOCATION OR NAME OF BRIDGES.	CULVERTS.		Waste w'r. length of waste.	FEEDERS TO CANAL.	
	Stone or composite	Number & span of opening or arch.		Names.	Capacity, cu. ft. per min., dry season.
Webster's, west bridge.....			Ft.		
Cressey's bridge.....					
Arch culvert.....	Stone...	6 chord.....			
Arch culvert.....	Stone...	6 chord.....			
Adams' basin bridge.....					
Combined culvert and Doty's bridge.....	{ Doub-ar. }	{ ..... }	29		
Culvert.....	{ 12 chord }	{ ..... }			
Chapin's bridge.....	Com'site	2 openings.....			
Cooley basin bridge.....					
Culvert.....	Com'site	2 openings.....			
Arch culvert.....	Stone...	4 chord.....			
Box culvert.....	Stone...	3 1/2 chord.....			
Brockport bridge.....					
Brockport, Main street.....					
T. P. waste weir, section.....			54		
Culvert 1, west of waste.....	Wood...	4 x 1.....			
Culvert 2, west of waste.....	Com'site	3 x 3.....			
Danforth bridge.....					
Culvert.....	Arch...	6 ft.....			
Culvert.....	Com'site	.....			
Culvert.....	Com'site	4 ft.....			
Miner's bridge.....					
County line bridge.....					
Arch culvert.....	Stone...	6 ft.....			
Arch culvert.....	Stone...	4 ft.....			
Stop gate.....					
Salisbury's bridge.....					
Berme waste weir.....			18		
Box culvert (old canal).....	Wood...				
Arch culvert (old canal).....	Stone...	11 ft.....			
Waste weir (old canal).....			68		
Frisbie's bridge (old canal).....					
Arch culvert.....	Stone...	18 ft.....			
Road bridge.....					
Arch culvert.....	Stone...	4 ft.....			
McCarty's bridge.....					
Arch culvert.....	Stone...	4 ft.....			
Arch culvert.....	Stone...	4 ft.....			
Tattle's bridge.....					
Stop gate.....					
Carleton's bridge.....					
Arch culvert.....	Stone...	10 ft.....			
Hulberton bridge.....					
Culvert.....	Stone...	4 ft.....			
Culvert and waste weir.....	Stone, 2	12 ft.....	24		
Brockville bridge.....					
Hindsburgh bridge.....					
Arch culvert.....	Stone...	6 ft.....			
Transit bridge.....					
Arch culvert.....	Stone...	4 ft.....			
Jaqueth's bridge.....					
Arch culvert.....	Stone...	4 ft.....			
Bidwell's bridge.....					
Box culvert.....	Stone...	2 x 4.....			
Brailley's bridge.....					
Arch culvert.....	Stone...	4 ft.....			
Hall's bridge.....					
Culvert and waste weir.....	Stone, 2	12 ft.....	92		
Box culvert.....	Stone...				
Ingersoll street bridge.....					
Batavia street bridge.....					
Culvert.....	Com'site	.....			

AMERICAN MEDICAL ASSOCIATION

PUBLISHED WEEKLY

VOLUME 100

NUMBER 1

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CHICAGO, ILL.

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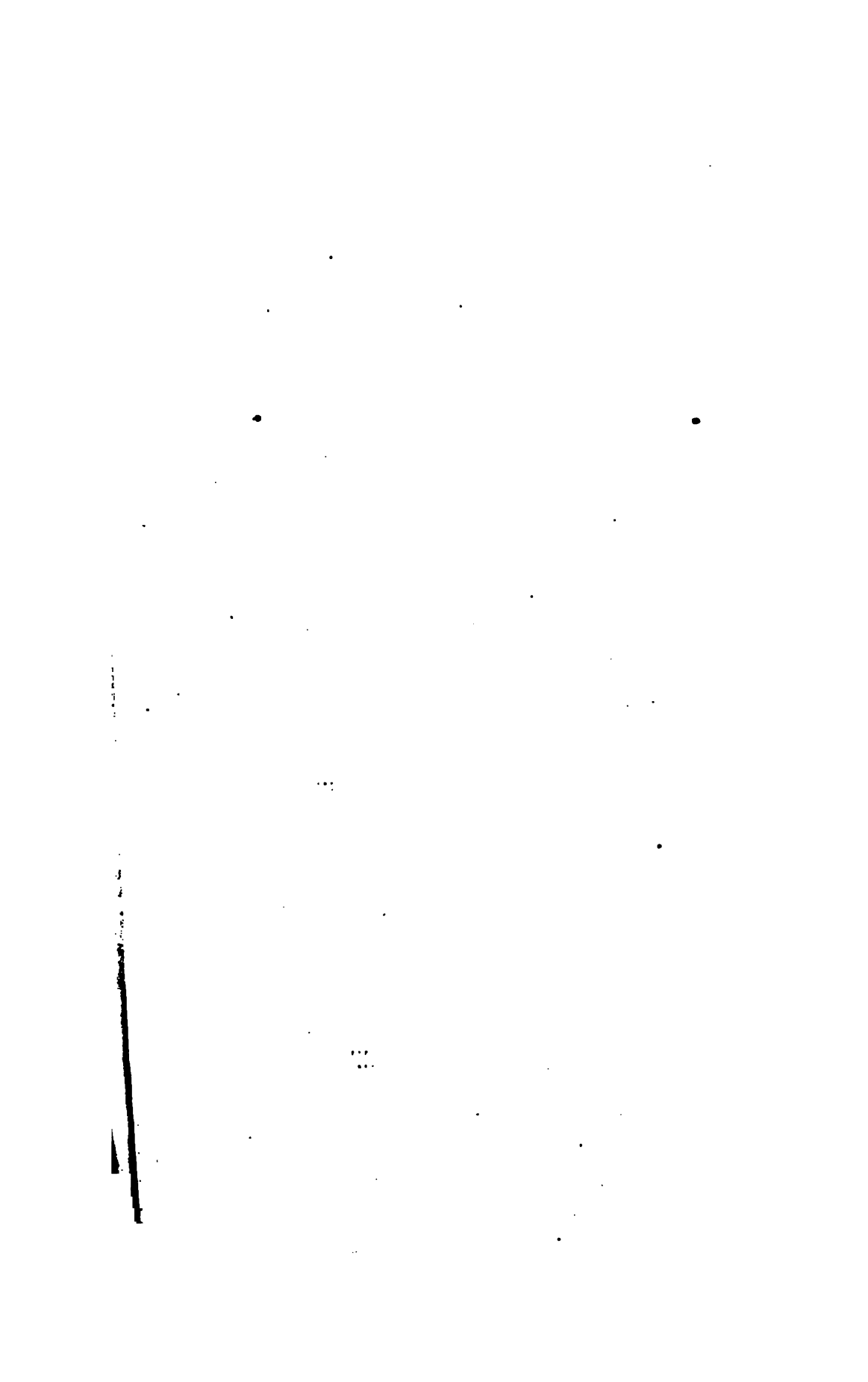
## CTURES BETWEEN NUMBERS OF BRIDGES.

LOCATION OR NAME OF STRUCTURE	Number and span of openings.	CULVERTS.		Waste w'r, length of waste.	FEEDERS TO CANAL.	
		Stone or composite	No. and span of opening or arch.		Names.	Capacity, cu. ft. per min., dry season
				Ft.		
Culvert.....		Com'site				
Culvert.....		do				
Culvert.....		do				
Lattice's bridge.....		Com'site				
Culvert.....						
Gaines' basin bridge.....		Com'site				
Culvert.....		do				
Arch culvert (Otter)				83		
Waste weir.....		Com'site				
Culvert.....						
Eagle Harbor bridge.....		Stone...	8 ft.			
Arch culvert.....						
Starkweather's bridge.....						
Allen bridge.....						
Burton bridge.....		Stone...	4 ft.			
Arch culvert.....		Com'site				
Culvert.....						
Knowlesville bridge.....		Stone...	6 ft.			
Arch culvert.....		do	4 ft.			
Arch culvert.....		Com'site				
Culvert.....		Stone, 2	12 ft.			
Arch culvert (Fish)		do	20 ft.			
Road culvert.....						
Stop gate.....		Stone...	4 ft.			
Arch culvert.....						
Beal's bridge.....		Com'site				
Culvert.....						
Hastings' bridge.....		Stone...	50 ft.			
Aqueduct bridge.....				51		
Waste weir (berm)						
Church street (Me)					} Oak Orchard creek. }	
Oak Orchard creek						
Shelby street bridge.....						
Stop gate.....		Com'site				
Culvert.....		Stone...	6 ft.			
Arch culvert.....						
Mason's bridge.....		Stone...	4 ft.			
Arch culvert.....						
Shelby basin bridge.....		Stone...	12 ft.			
Arch culvert.....						
Town line bridge.....						
Coon's bridge.....		Com'site				
Culvert.....		St. box				
Culvert.....						
Vernon street bridge.....						
Main street bridge.....		Com'site				
Culvert.....		Stone, 2	10 ft.	60		
Culvert and waste		Com'site				
Culvert.....						
Williams' bridge.....						
Watson's bridge.....				16		
Waste weir, berm		Stone...	10 ft.			
Arch culvert (Jo)						
Hurd's bridge.....		Stone...	4 ft.			
Arch culvert.....						
Hurd's bridge.....		Stone...	6 ft.			
Arch culvert.....						
Reynolds basin bridge.....		Com'site				
Culvert.....						
Maybee's bridge.....		Stone...	18 ft.			
Maybee's arch culvert				36		
Waste weir, berm						



# RN DIVISION.

No. of bridges, E. to W.	LOCATION OR NAME OF BRIDGE	Number and span of openings.	RELATIONS BETWEEN NUMBERS OF BRIDGES.				
			CULVERTS.		Waste w'r, length of waste.	FEEDERS TO CANAL.	
			Stone or composite	Number & span of opening or arch.		Names.	Capacity, cu. ft. per min., dry season.
					Ft.		
	Culvert .....		Com'site				
155	Gas Port bridge .....		Com'site				
	Culvert .....		Com'site				
156	Orangeport bridge .....		Com'site				
	Culvert .....		Com'site				
	Arch culvert .....		Stone...	4 ft			
	Arch culvert, Robt .....		Stone...	6 ft			
157	Millard's bridge .....		Stone...	6 ft			
	Arch culvert .....		Stone...	6 ft			
	Arch culvert .....		Stone...	6 ft			
158	Wakeman's bridge .....		Stone...	4 ft			
	Stop gate .....		Stone...	4 ft			
	Arch culvert .....		Stone...	4 ft			
159	Young's bridge .....		Stone...	4 ft			
160	Comstock's bridge .....		Stone...	4 ft			
161	Adams street bridge .....		Stone...	4 ft			
	Arch culvert .....		Stone...	4 ft			
162	Chapel street bridge .....		Stone...	12 ft	96		
163	Exchange street bridge .....		Stone...	12 ft	96		
164	Cady's bridge, Loc .....		Stone...	12 ft	96		
165	N. Y. Central R. R. .....		Stone...	12 ft	96		
	5 double locks .....		Stone...	12 ft	96		
166	Pine street bridge, .....		Stone...	12 ft	96		
167	Cottage street bridge .....		Stone...	12 ft	96		
168	Main street bridge, .....		Stone...	12 ft	96		
169	Transit street bridge .....		Stone...	12 ft	96		
170	Hitchins' street bridge .....		Stone...	12 ft	96		
171	Hitchins'-st. bridge .....		Stone...	12 ft	96		
172	Heacox bridge .....		Stone...	12 ft	96		
	Path extension .....		Stone...	12 ft	96		
	Berne extension .....		Stone...	12 ft	96		
173	Hawley's path extension .....		Stone...	12 ft	96		
	Berne extension .....		Stone...	12 ft	96		
	Guard lock (Sulphur) .....		Stone...	12 ft	96		
174	Bridge (guard lock) .....		Stone...	12 ft	96		
175	R. br. and T. P. ch .....		Stone...	12 ft	96		
176	do Pendle .....		Stone...	12 ft	96		
177	T. P. bridge, Tonawanda .....		Stone...	12 ft	96		
178	T. P. bridge, Ransom .....		Stone...	12 ft	96		
179	Pickards' bridge, T .....		Stone...	12 ft	96		
180	Canandaigua R. R. .....		Stone...	12 ft	96		
181	T. P. and R. bridge .....		Stone...	12 ft	96	215	
182	Tonawanda creek d .....		Stone...	12 ft	96		
183	Buffalo and N. Fall .....		Stone...	12 ft	96		
184	Military road bridge .....		Stone...	12 ft	96		
185	Bridge over slip to .....		Stone...	12 ft	96		
186	Bridge, Seymour st .....		Stone...	12 ft	96		
	Elevator bridge .....		Stone...	12 ft	96		
	State ditch culvert .....		Com'site				
187	T. P. change bridge .....		Com'site				
188	Bates' Ferry bridge .....		Com'site				
189	Cherry's bridge .....		Com'site				
190	Limberg's bridge .....		Com'site				
191	Scott's bridge .....		Com'site				
	Culvert (Cornelius .....		Com'site				
192	T. P. change bridge .....		Com'site				



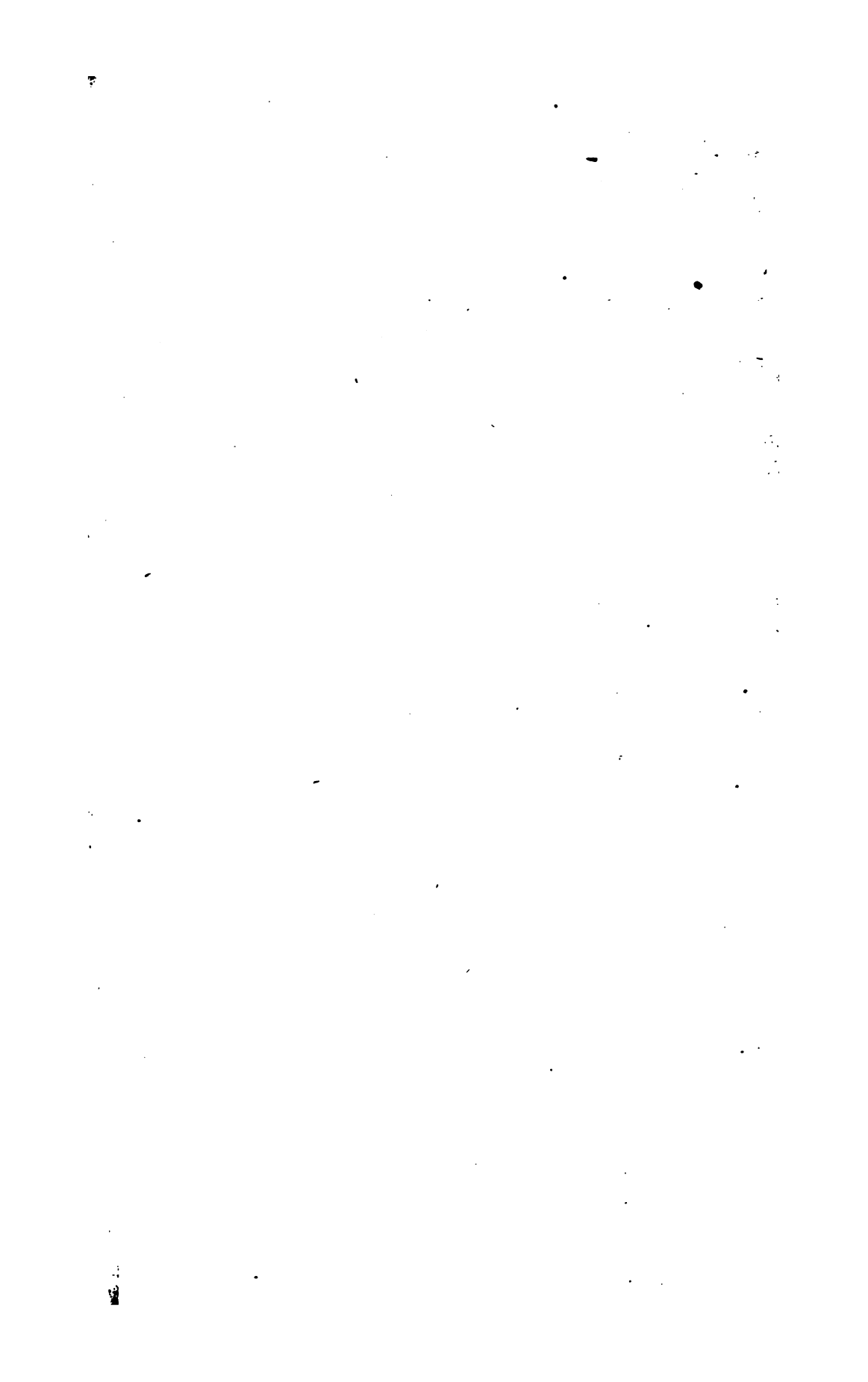
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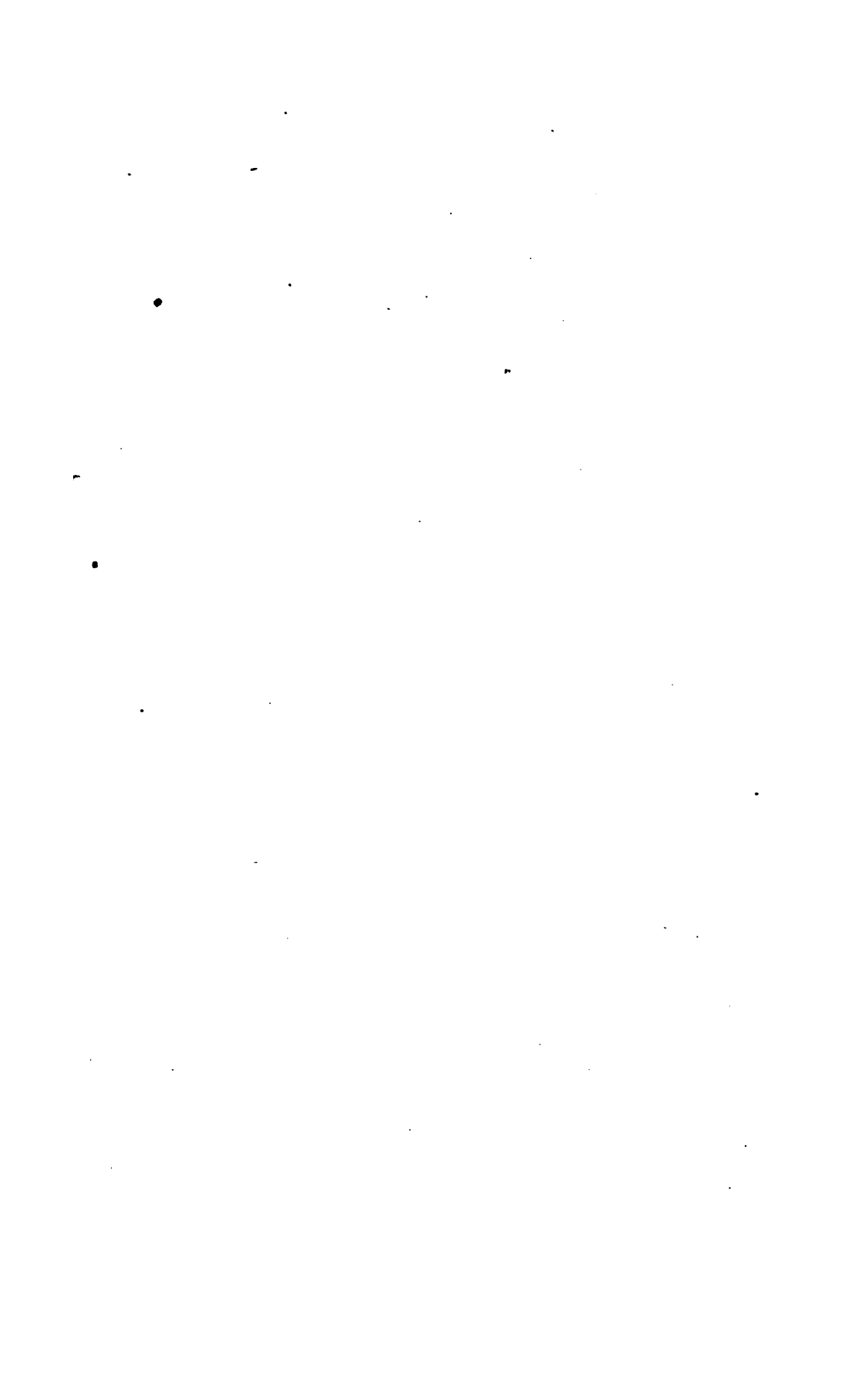
PICTURES BETWEEN NUMBERS OF BRIDGES.

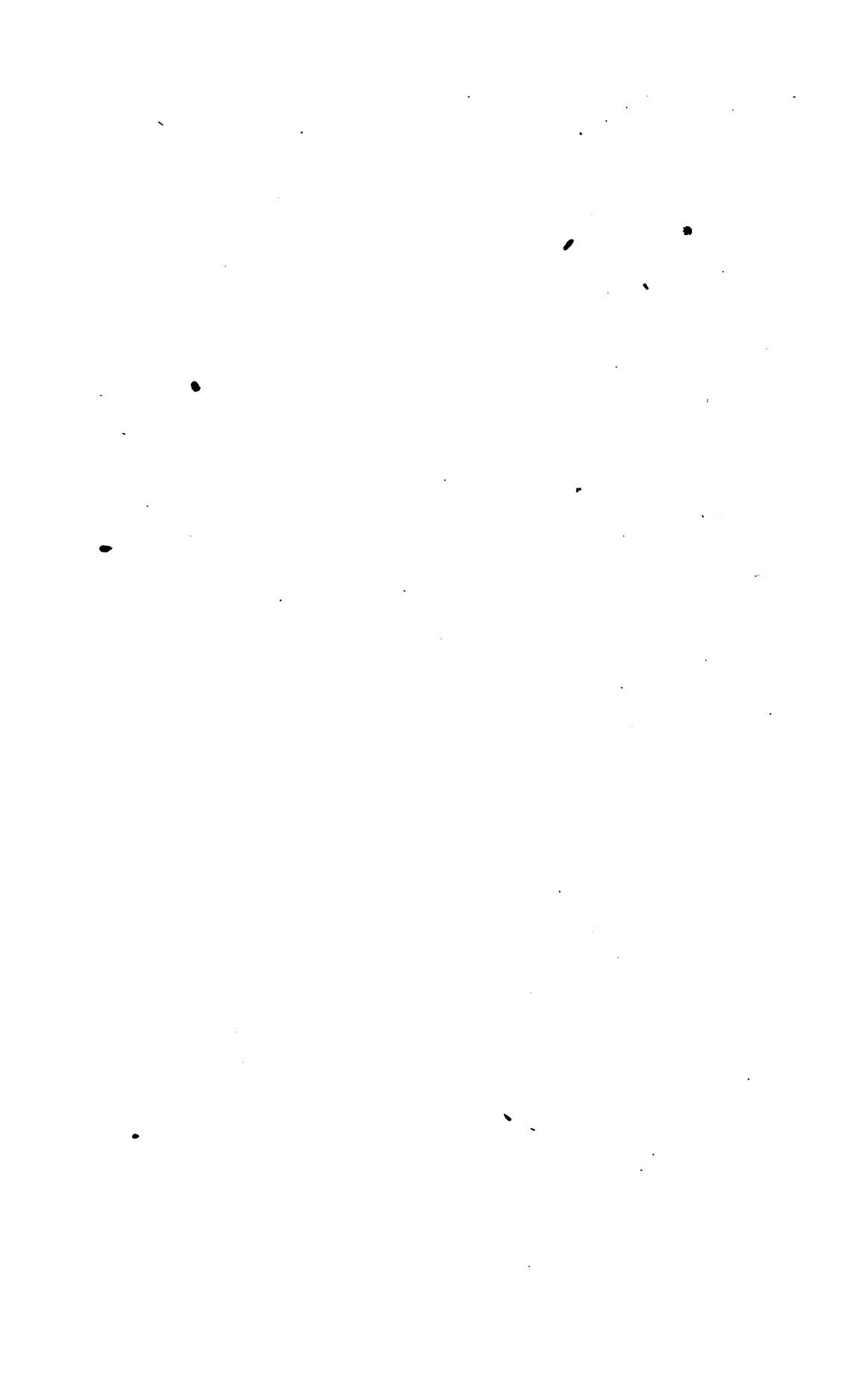
LOCATION OF number and span of openings.	CULVERTS.		Waste w'r, length of waste.	FEEDERS TO CANAL.	
	Stone or composite	No. and span of opening or arch.		Names.	Capacity, cu. ft. per min., dry season.
ward and bul			Ft.		
amilton street					
mherst street					
rie mills brid					
. P. floating					
erry street br					
uffalo and N.					
. P. change					
enesee street					
. P. bridge o					
. P. bridge o					
. P. bridge o					
rie street bri					
vans street b					
ommercial str					
loyd street b					
ain street bri					
ashington st.					
and Hambur					
aste weir, 2	Wood...		10		
ichigan street					
. R. Main & J					
hicago-st. an					
ouisiana-st.					
erry street, C					
lk street, Oh					
hio street (to					
erry-st., Clar					
lk.st., Clark					
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anal street, C					
time street, C					
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larissa street					
alvert	Stone...				
uard lock					
enesee river					









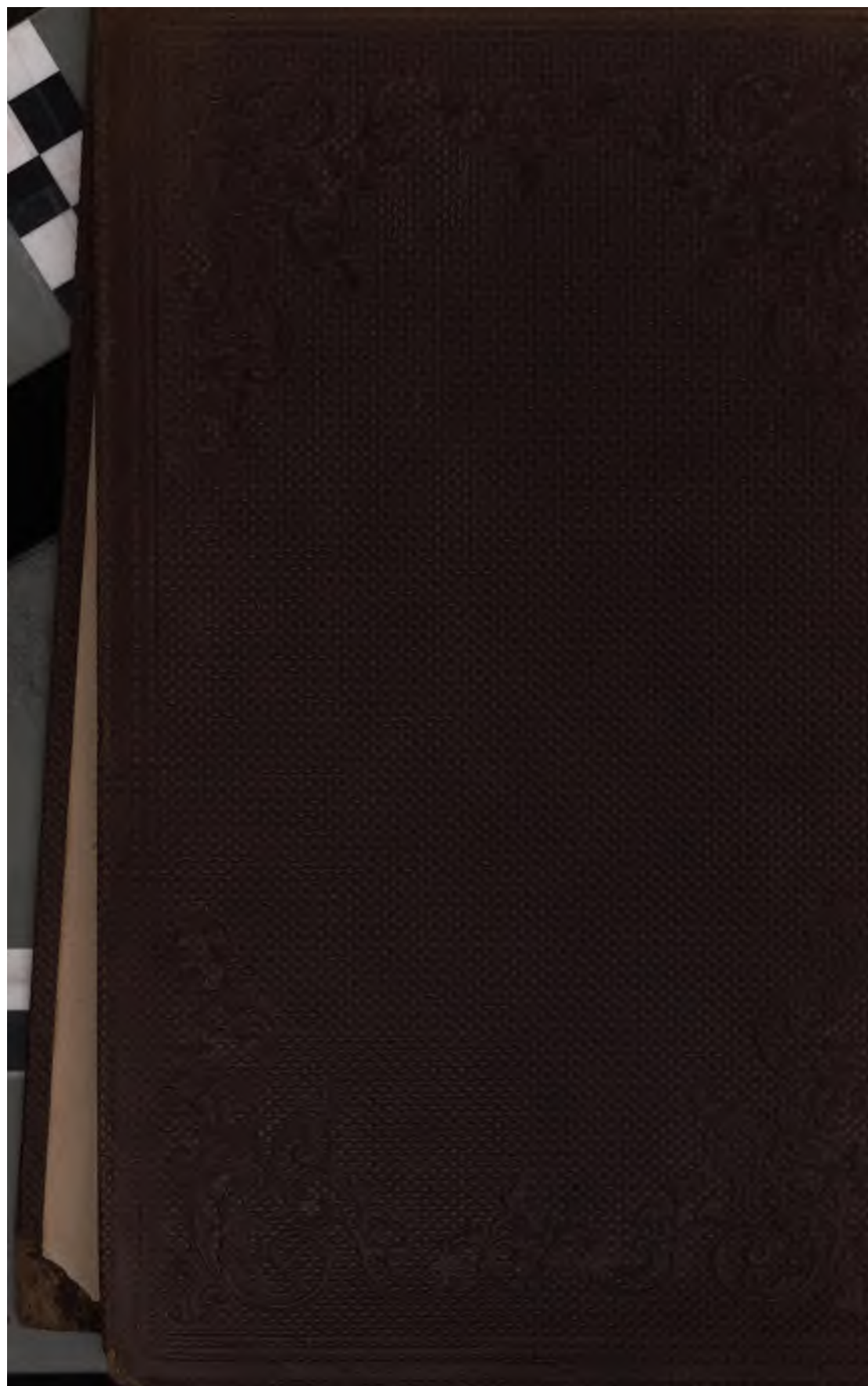




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URES BETWEEN NUMBERS OF BRIDGES.

LOCATION OR NAME of openings.	CULVERTS.		Waste w'r, length of waste.	FEEDERS TO CANAL.	
	Stone or composite	Number & span of opening or arch.		Names.	Capacity, cu. ft. per min., dry season.
REPAIR SECT			Ft. in.		
Albany basin					
Lock No. 1, Albany					
Water street, Alban					
Lawrence street, Al					
Veigh lock, Albany					
Ferry street, Albany			29		
Waste weir, section					
Culvert, Patroon cre	St. arch.	3 spans, 10, 11, 10			
Patroon					
Culvert.	St. arch.				
Lock No. 2.					
Culvert.	St. arch.				
Bull's Head					
Culvert.	St. arch.				
Van Rensselaer's					
Culvert.	St. arch.				
Schuyler's					
Culvert	St. arch.				
Dunlop's.					
Culvert.	St. arch.	2 of 7 ft. 6 in			
Schuyler's					
Culvert	Stone				
Deanham's.					
Mansion street, Port					
Locks, Port Schuyler					
Side-cut					
Albany and Troy					
U. S. Arsenal.					
U. S. Arsenal.					
Schenectady street,					
Culvert.	St. box.				
Ferry street, West T					
anal street, West T					
ennessee street, West					
ocks, West Troy sid					
ide-cut					
Union street, West T					
urn street, West					
Veigh lock, West Tr					
. Y. Central R. R.					
hamplain canal				Mohawk, thro' Champlain. }	6.570
unction of Champla					
Lock No. 3, Junction					
ulvert and waste w	St. arch.		29 9		
orthern railroad					
Lock No. 4.					
othou's					
Lock No. 5.					
Lock No. 6.					
Culvert, Lansing cre	St. arch.	1 of 12 ft.			
Lock No. 7.					
Lock No. 8.					
Alexander's.					
Lock No. 9.					
Culvert and waste w	St. arch.	1 of 8 ft.	13		
Lock No. 10.					
Lock No. 11.					
Lock No. 12.					
Columbia street, Coh					
Lock No. 13.					
Culvert.	St. arch.	1 of 8 ft.			